

=> FILE REG

FILE 'REGISTRY' ENTERED AT 13:05:35 ON 15 AUG 2007

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=> DISPLAY HISTORY FULL L1-

FILE 'REGISTRY' ENTERED AT 11:50:07 ON 15 AUG 2007

E LITHIUM/CN

L1 1 SEA LITHIUM/CN

FILE 'HCA' ENTERED AT 11:55:14 ON 15 AUG 2007

L2 246195 SEA ANOD## OR (NEG# OR NEGATIV?)(2A)ELECTROD##
L3 94666 SEA L1 OR (LITHIUM# OR LI)(2A)(METAL#### OR ELEMENT? OR
FOIL? OR PURE# OR PURIF?)
L4 841 SEA ((LITHIUM# OR LITHIAT? OR LI)(2A)(SULFUR# OR
S))(3A)(BATTERY OR BATTERIES)
L5 89950 SEA PROTECT?(2A)(LAYER? OR FILM? OR COAT?)
L6 33798 SEA ION##(2A)CONDUCTIVIT? OR S(2W)(CM# OR CENTIMET?)
L7 175323 SEA (ELEC# OR ELECTRIC?)(2A)CONDUCTIVIT?
L8 9210 SEA L2 AND L3
L9 331 SEA L2 AND L4
L10 10 SEA L9 AND L5
L11 5 SEA L9 AND L6
L12 13 SEA L9 AND L7
L13 0 SEA L10 AND L12
L14 13 SEA L4 AND L5
L15 3 SEA L14 AND (L6 OR L7)
L16 119 SEA L8 AND L5
L17 9 SEA L16 AND L6
L18 2 SEA L16 AND L7
L19 21 SEA L4 AND L6
L20 33 SEA L4 AND L7
L21 3 SEA (L19 OR L20) AND L5
L22 188 SEA L2 AND L3 AND L6
L23 185 SEA L2 AND L3 AND L7
L24 9 SEA L22 AND L5
L25 2 SEA L23 AND L5
L26 12 SEA L11 OR L15 OR L17 OR L18 OR L21 OR L24 OR L25
L27 20 SEA (L10 OR L12) NOT L26
L28 9 SEA 1840-2003/PY,PRY AND L26
L29 17 SEA 1840-2003/PY,PRY AND L27
L30 125488 SEA CRYST?(2A)(MATERIAL# OR FILM? OR COAT? OR LAYER?)
L31 89 SEA ((L2 AND L3) OR L4) AND L30
L32 3 SEA L31 AND (L6 OR L7)
L33 0 SEA L31 AND L5
L34 4221 SEA L1 (L) (ANOD## OR (NEG# OR NEGATIV?)(2A)ELECTROD##)
L35 14083 SEA (LITHIUM# OR LI)(2A)L2
L36 68 SEA L31 AND (L34 OR L35)
L37 84675 SEA L1
L38 4704 SEA L35 AND L37
L39 2467 SEA L1(3A)L2
L40 45 SEA (L38 OR L39) AND L30

L41 0 SEA L40 AND L5
 L42 0 SEA L40 AND PROTECT?
 L43 3 SEA L4 AND L30
 L44 1397 SEA L2 AND L30
 L45 59 SEA L44 AND L37
 L46 1 SEA L45 AND PROTECT?
 L47 86 SEA L44 AND L3
 L48 1 SEA L47 AND PROTECT?
 L49 83711 SEA CRYST?(3A)(OXIDE# OR NITRIDE# OR OXYNITRIDE# OR
 SULFIDE# OR OXYSULFIDE# OR HALONITRIDE# OR FLUORONITRIDE#
 OR CHLORONITRIDE# OR BROMONITRIDE# OR IODONITRIDE#)
 L50 7646 SEA CRYST?(3A)(OXIDE# OR NITRIDE# OR OXYNITRIDE# OR
 SULFIDE# OR OXYSULFIDE# OR HALONITRIDE# OR FLUORONITRIDE#
 OR CHLORONITRIDE# OR BROMONITRIDE# OR IODONITRIDE#)(3A)(
 FILM? OR LAYER? OR COAT?)
 L51 0 SEA L4 AND L50
 L52 0 SEA L4 AND L49
 L53 5 SEA L2 AND L3 AND L50
 L54 67 SEA L2 AND L3 AND L49
 L55 0 SEA L54 AND PROTECT?
 L56 2 SEA L54 AND (L6 OR L7)
 L57 4 SEA (L40 OR L45 OR L47 OR L54) AND (L6 OR L7)
 L58 13 SEA L32 OR L43 OR L46 OR L48 OR L53 OR L56 OR L57
 L59 12 SEA 1840-2003/PY,PRY AND L58

FILE 'REGISTRY' ENTERED AT 12:39:58 ON 15 AUG 2007

L60 34420 SEA (LI (L) N)/ELS
 L61 34 SEA L60 (L) 2/ELC.SUB
 E LITHIUM ALUMINUM HYDRIDE/CN
 L62 1 SEA "LITHIUM ALUMINUM HYDRIDE"/CN OR "LITHIUM ALUMINUM
 HYDRIDE (LIALH4)"/CN
 L63 5553 SEA L60 AND A7/PG
 L64 22 SEA L63 AND 3/ELC.SUB
 L65 120 SEA L63 AND (NA OR K OR RB OR CS)/ELS
 L66 12 SEA L65 AND 4/ELC.SUB
 E LITHIUM ALUMINUM CHLORIDE/CN
 L67 1 SEA "LITHIUM ALUMINUM CHLORIDE (LIALCL4)"/CN

FILE 'HCA' ENTERED AT 12:47:09 ON 15 AUG 2007

L68 1088 SEA L67 OR LIALCL4 OR ALLICL4
 L69 1392 SEA L61
 L70 45 SEA L64
 L71 3 SEA L66
 L72 94 SEA L68 AND L4
 L73 1 SEA L72 AND L5
 L74 0 SEA L72 AND L30
 L75 0 SEA L72 AND L49
 L76 0 SEA L72 AND L50
 L77 1 SEA L72 AND PROTECT?
 L78 6 SEA L69 AND L4
 L79 1 SEA L70 AND L4
 L80 1 SEA L71 AND L4
 L81 1 SEA L72 AND (L5 OR L6)
 L82 255 SEA L2 AND L3 AND L68
 L83 5 SEA L82 AND L5
 L84 1 SEA L82 AND L30

L85 1 SEA L82 AND L49
 L86 0 SEA L82 AND L50
 L87 7 SEA L82 AND PROTECT?
 L88 11 SEA L82 AND (L5 OR L6)
 L89 114 SEA L2 AND L3 AND L69
 L90 12 SEA L72 AND (L6 OR L7)
 L91 10 SEA L89 AND L5
 L92 2 SEA L89 AND L30
 L93 1 SEA L89 AND L49
 L94 0 SEA L89 AND L50
 L95 18 SEA L89 AND PROTECT?
 L96 8 SEA L89 AND (L6 OR L7)
 L97 3 SEA L2 AND L3 AND L70
 L98 1 SEA L2 AND L3 AND L71
 L99 24 SEA L73 OR L77 OR L78 OR L79 OR L80 OR L81 OR L83 OR L84
 OR L85 OR L87 OR L92 OR L93 OR L96 OR L97 OR L98
 L100 28 SEA (L88 OR L90 OR L91 OR L95) NOT L99
 L101 21 SEA 1840-2003/PY,PRY AND L99
 L102 26 SEA 1840-2003/PY,PRY AND L100

=> FILE HCA

FILE 'HCA' ENTERED AT 13:06:38 ON 15 AUG 2007

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(CLAIMS 1-3)

=> D L28 1-9 BIB ABS HITSTR HITIND

L28 ANSWER 1 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 142:264352 HCA Full-text

TI Composition for protecting anode for lithium
metal battery

IN Hwang, Duck-Chul; Hwang, Seung-Sik; Cho, Chung-Kun; Lee, Sang-Mock

PA S. Korea

SO U.S. Pat. Appl. Publ., 12 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2005042515	A1	20050224	US 2004-923126	
			200408	
			19	
		<--		
JP 2005071998	A	20050317	JP 2004-239903	
			200408	
			19	

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Li

IC ICM H01M004-58
ICS H01M004-62; H01M004-48
INCL 429231950; 252182100; 429217000; 429231100
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST anode protection compn lithium metal
battery
IT Alcohols, uses
(alkoxy; compn. for protecting anode for
lithium metal battery)
IT Battery anodes
Coating materials
Ionic conductivity
Plasticizers
(compn. for protecting anode for lithium
metal battery)
IT Ethers, uses
(cyclic; compn. for protecting anode for
lithium metal battery)
IT Secondary batteries
(lithium; compn. for protecting anode for
lithium metal battery)
IT Lithium alloy, base
(compn. for protecting anode for lithium
metal battery)
IT 174674-36-3P
(coating; compn. for protecting anode
for lithium metal battery)
IT 554-13-2, Lithium carbonate 10102-24-6, Lithium silicate
10377-52-3, Lithium phosphate 12676-27-6 26134-62-3, Lithium
nitride (Li3N) 37220-89-6, Lithium aluminate 39302-37-9, Lithium
titanium oxide 152747-89-2, Lanthanum lithium oxide 184905-46-2,
Lithium nitrogen phosphorus oxide 236388-73-1, Lithium silicide
sulfide 236388-74-2, Lithium boride sulfide 236388-75-3,
Aluminum lithium sulfide 236388-76-4, Lithium phosphide sulfide
342379-43-5, Germanium lithium sulfide
(coating; compn. for protecting anode

- for lithium metal battery)
- IT 540-72-7, Sodium thiocyanate 556-65-0, Lithium thiocyanate 2923-17-3, Lithium trifluoroacetate 7439-93-2, Lithium, uses 7440-44-0D, Carbon, sulfur compd., polymer 7601-89-0, Sodium perchlorate 7704-34-9D, Sulfur, carbon compd., polymer 7791-03-9, Lithium perchlorate 10544-50-0, Sulfur s8, uses 13755-29-8, Sodium tetrafluoroborate 14024-11-4, Lithium tetrachloroaluminate 14075-53-7, Potassium tetrafluoroborate 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 33454-82-9, Lithium triflate 74432-42-1, Lithium polysulfide 89319-52-8, Ethylene glycol dimethacrylate-polyethylene glycol methyl ether methacrylate copolymer 90076-65-6 108927-94-2 124634-22-6 131651-65-5, Lithium nonafluorobutanesulfonate 132843-44-8 133756-68-0 142289-27-8 195979-38-5 355838-46-9, Polyethylene glycol dimethacrylate-polyethylene glycol ethyl ether methacrylate copolymer 455921-75-2 845778-95-2 845778-97-4 845779-00-2 845779-09-1 845779-16-0 845779-19-3 845779-22-8 (compn. for protecting anode for lithium metal battery)
- IT 110-71-4 111-96-6, Bis(2-methoxyethyl ether) 112-49-2, Triethylene glycol dimethyl ether 143-24-8, Tetraethylene glycol dimethyl ether 646-06-0, Dioxolane 7778-85-0, Propylene glycol dimethyl ether 24991-55-7, Polyethylene glycol dimethyl ether (compn. for protecting anode for lithium metal battery)
- IT 84-51-5, 2-EthylAnthraquinone 84-65-1, Anthraquinone 86-74-8, Carbazole 93-97-0, Benzoyl benzoate 98-86-2, Acetophenone, processes 119-53-9, Benzoin 119-61-9, Benzophenone, processes 120-51-4, Benzyl benzoate 131-09-9, 2-ChloroAnthraquinone 131-56-6, 2,4-DihydroxyBenzophenone 131-57-7, 2-Hydroxy-4-methoxybenzophenone 134-85-0, p-ChloroBenzophenone 150-60-7, Benzyl disulfide 431-03-8, Butanedione 486-25-9, Fluorenone 492-22-8, Thioxanthone 574-09-4, Benzoinethylether 947-19-3, 1-Hydroxycyclohexyl phenyl ketone 2648-61-5 2902-69-4 6175-45-7, 2,2-DiethoxyAcetophenone 6652-29-5, Benzoin phenyl ether 7473-98-5, 2-Hydroxy-2-methylpropiophenone 22499-12-3, Benzoinisobutylether 24650-42-8, 2,2-DimethoxyphenylAcetophenone 27962-49-8 72896-34-5, ChloroThioxanthone 75081-21-9, Isopropyl Thioxanthone (photoinitiator; compn. for protecting anode for lithium metal battery)
- IT 80-15-9, Cumyl hydroperoxide 94-36-0, Benzoyl peroxide, processes 110-05-4, Di-tert-butyl peroxide 110-22-5, Acetyl peroxide 2895-03-6, Dilauryl peroxide 13472-08-7, 2,2'-Azobisisovaleronitrile 66205-07-0, 2,2'-Azobisbutyronitrile (thermal initiator; compn. for protecting anode for lithium metal battery)

L28 ANSWER 2 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 141:368410 HCA [Full-text](#)

TI Method of preparation of anode for lithium battery

IN Lee, Jong-Ki; Lee, Jea-Woan; Cho, Chung-Kun; Lee, Sang-Mock

PA Samsung SDI Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 8 pp.

CODEN: USXXCO

DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2004209159	A1	20041021	US 2004-820762	20040409
		<--		
KR 2004090561	A	20041026	KR 2003-24427	20030417
JP 2004319489	A	20041111	JP 2004-116658	20040412
		<--		
CN 1571187	A	20050126	CN 2004-10071491	20040417

PRAI KR 2003-24427 A 20030417 <--

AB A neg. electrode of a lithium battery includes a lithium metal and a protective layer that includes a material having an ion cond. of at least 5×10^{-5} S/cm. The protective layer includes ion conductive material that has a dense internal structure and an effective adhesive strength to the lithium metal. Although the protective layer has a thickness in the order of micrometers, the protective layer does not cause resistance to the electrochem. reaction and is chem. stable with respect to both the lithium metal and the electrolyte.

IT 7439-93-2, Lithium, uses
(method of prepn. of anode for lithium battery)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M002-16

ICS H01M004-40; B05D005-12

INCL 429137000; X42-924.6; X42-923.195; X42-712.3

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST anode prepn lithium battery

IT Vapor deposition process
(chem., laser-assisted; method of prepn. of anode for lithium battery)

IT Vapor deposition process
(chem.; method of prepn. of anode for lithium battery)

IT Secondary batteries
(lithium, Li-S; method of prepn. of anode for lithium battery)

IT Battery anodes
Electron beam evaporation
Ion beam sputtering
Ionic conductivity
Laser ablation
Sputtering

(method of prepn. of anode for lithium battery)

IT Polyesters, uses
(method of prepn. of anode for lithium battery)

IT Vapor deposition process
(plasma; method of prepn. of anode for lithium battery)

IT Nitrides
Oxides (inorganic), uses
Oxynitrides
Sulfides, uses
(protective layer; method of prepn. of anode for lithium battery)

IT Evaporation
(vacuum thermal; method of prepn. of anode for lithium battery)

IT Jets
(vapor, deposition; method of prepn. of anode for lithium battery)

IT 7439-93-2, Lithium, uses
(method of prepn. of anode for lithium battery)

IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses
7446-09-5, Sulfur dioxide, uses 7727-37-9, Nitrogen, uses
7782-44-7, Oxygen, uses 7782-50-5, Chlorine, uses 25038-59-9, uses
(method of prepn. of anode for lithium battery)

IT 12015-64-4, Lithium chloride nitride (Li9Cl3N2) 14024-11-4, Lithium tetrachloroaluminate 26134-62-3, Lithium nitride (Li3N) 73071-42-8, Lithium iodide nitride (Li10IN3) 778589-21-2, Lithium sodium chloride nitride ((Li,Na)9Cl3N2) 778589-22-3, Lithium potassium chloride nitride ((Li,K)9Cl3N2) 778589-23-4, Lithium rubidium chloride nitride ((Li,Rb)9Cl3N2) 778589-24-5, Cesium lithium chloride nitride ((Cs,Li)9Cl3N2) 778589-25-6, Lithium sodium iodide nitride (Li9NaIN3) 778589-26-7, Lithium potassium iodide nitride (Li9KIN3) 778589-27-8, Lithium rubidium iodide nitride (Li9RbIN3)
(protective layer; method of prepn. of anode for lithium battery)

L28 ANSWER 3 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 140:378090 HCA [Full-text](#)

TI Anodes for lithium-sulfur batteries, their manufacture, and lithium-sulfur batteries using them

IN Lee, Jong Ki; Lee, Je Won; Cho, Joung Keun; Lee, Sang Muk; Kim, Min Hyup

PA Samsung SDI Co., Ltd., S. Korea

SO Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	JP 2004139968	A	20040513	JP 2003-276606 200307 18
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KR 2004035100 A 20040429 KR 2002-63834
200210
18

US 2004137330 A1 20040715 US 2003-688781
200310
17

<--
CN 1508893 A 20040630 CN 2003-10123734
200310
18

<--
PRAI KR 2002-63834 A 20021018 <--

AB The anodes for lithium-sulfur batteries are manufd. by forming a pretreatment layer (thickness 50-5000 Å) contg. Li+-conductive substances having ionic cond. $\geq 1 + 10^{-10}$ S/cm on Li metal by vapor deposition under inert gas atm. and forming a Li metal-protective film by vapor deposition. Preferably, the Li+-conductive substance may be Li₃PO₄ and the protective layer contains Li_{2.9}PO_{3.3}N_{0.46}. Lithium-sulfur batteries contain the anodes above and cathodes contg. cathode active materials selected from S element, S-series compds., and their mixts. The anode pretreatment layer shows high ionic cond. and no vol. expansion.

IT 7439-93-2, Lithium, uses
(manuf. of lithium-sulfur battery
anodes having Li+-conductive pretreatment layer and
Li metal-protective layer)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-02

ICS H01M004-04; H01M004-40; H01M004-62; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST lithium sulfur battery anode
lithium phosphate; phosphorus oxynitride lithium
anode battery

IT Controlled atmospheres
(inert, in vapor deposition; manuf. of lithium-
sulfur battery anodes having
Li+-conductive pretreatment layer and Li metal
-protective layer)

IT Secondary batteries
(lithium-sulfur; manuf. of lithium-
sulfur battery anodes having
Li+-conductive pretreatment layer and Li metal
-protective layer)

IT Battery anodes
Battery cathodes
Ionic conductors
Vapor deposition process
(manuf. of lithium-sulfur battery
anodes having Li+-conductive pretreatment layer and
Li metal-protective layer)

- IT 7704-34-9, Sulfur, uses
(cathode; manuf. of lithium-sulfur
battery anodes having Li+-conductive
pretreatment layer and Li metal-
protective layer)
- IT 7440-01-9, Neon, uses 7440-37-1, Argon, uses 7440-59-7, Helium,
uses
(inert atm. in vapor deposition; manuf. of lithium-
sulfur battery anodes having
Li+-conductive pretreatment layer and Li metal
-protective layer)
- IT 7439-93-2, Lithium, uses
(manuf. of lithium-sulfur battery
anodes having Li+-conductive pretreatment layer and
Li metal-protective layer)
- IT 10377-52-3, Lithium phosphate
(pretreatment layer; manuf. of lithium-sulfur
battery anodes having Li+-conductive
pretreatment layer and Li metal-
protective layer)
- IT 150499-39-1, Lithium metaphosphate nitride oxide
($\text{Li}_{2.9}(\text{PO}_3)\text{N}_{0.46}\text{O}_{0.3}$)
(protective layer; manuf. of lithium
-sulfur battery anodes having
Li+-conductive pretreatment layer and Li metal
-protective layer)

L28 ANSWER 4 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 139:263215 HCA [Full-text](#)

TI Electrochemical performance of lithium/sulfur
batteries with protected Li anodes

AU Lee, Yong Min; Choi, Nam-Soon; Park, Jung Hwa; Park, Jung-Ki

CS Center for Advanced Functional Polymers, Department of Chemical and
Biomolecular Engineering, Korea Advanced Institute of Science and
Technology, Yuseong-gu, Daejeon, 305-701, S. Korea

SO Journal of Power Sources (2003), 119-121, 964-972

CODEN: JPSODZ; ISSN: 0378-7753

PB Elsevier Science B.V.

DT Journal

LA English

AB The protection layer was introduced to the surface of the Li anode to enhance the charge/discharge performance of lithium/sulfur batteries. The protection layer was formed by a crosslinking reaction of the curable monomer in the presence of liq. electrolyte and a photoinitiator. When the Li anode is coated with the protection layer, the unit cells with a liq. electrolyte showed an enhanced charge/discharge performance as compared to cells based on a polymer electrolyte, resulting in an av. discharge capacity of 270 mAh/g-cathode during 100 cycles. All the charge/discharge tests were performed at room temps.

IT 7439-93-2, Lithium, uses
(electrochem. performance of lithium/sulfur
batteries with protected Li anodes)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 37

ST lithium sulfur electrode battery
protected anode

IT Battery anodes

Polymer electrolytes

(electrochem. performance of lithium/sulfur
batteries with protected Li anodes)

IT Secondary batteries

(lithium; electrochem. performance of lithium/
sulfur batteries with protected Li
anodes)

IT Ionic conductivity

(of polymeric electrolyte; electrochem. performance of
lithium/sulfur batteries with
protected Li anodes)

IT 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses
(electrochem. performance of lithium/sulfur
batteries with protected Li anodes)

IT 25721-76-0, Poly(ethylene glycol) dimethacrylate
(protective film; electrochem. performance of
lithium/sulfur batteries with
protected Li anodes)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 5 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 139:263186 HCA [Full-text](#)

TI Interfacial enhancement between lithium electrode and polymer
electrolytes

AU Choi, Nam-Soon; Lee, Yong Min; Park, Jung Hwa; Park, Jung-Ki

CS Center for Advanced Functional Polymers, Department of Chemical and
Biomolecular Engineering, Korea Advanced Institute of Science and
Technology, Yuseong-gu, Daejeon, 305-701, S. Korea

SO Journal of Power Sources (2003), 119-121, 610-616

CODEN: JPSODZ; ISSN: 0378-7753

PB Elsevier Science B.V.

DT Journal

LA English

AB A protected lithium electrode was prepd. by forming a protection layer on the surface of lithium metal. The protection layer was formed by UV radiation-curing of a mixt. of crosslinking agent (1,6-hexanediol diacrylate), liq. electrolyte (ethylene carbonate (EC)/propylene carbonate (PC)/1 M LiClO₄), and photoinitiator (Me benzoylformate). The interfacial properties of a sym. lithium cell contg. the protected lithium electrode was better than those of the cell using a bare lithium electrode with storage. The performance of unit cells was also enhanced by the introduction of the protection layer on the surface of the lithium anode. The morphol. of the solid electrolyte interphase (SEI) layer developed on the protected lithium anode during the charge-discharge runs at 1C rate was smoother at the surface and less porous.

IT 7439-93-2, Lithium, uses

(interfacial enhancement between lithium electrode and polymer
gel electrolytes)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 76

ST interfacial lithium electrode polymer electrolyte battery
crosslinked acrylate; SEM discharge capacity gel polymer electrolyte
anode degrdn protection

IT Battery anodes

(degrdn. protection from gel polymer electrolyte coating;
interfacial enhancement between lithium electrode and polymer
electrolytes)

IT Ionic conductivity

(of gel polymer electrolytes; interfacial enhancement between
lithium electrode and polymer electrolytes)

IT 7439-93-2, Lithium, uses

(interfacial enhancement between lithium electrode and polymer
gel electrolytes)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 6 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 138:295403 HCA [Full-text](#)

TI Preparation and characterization of plasticized polymer electrolytes
based on the PVdF-HFP copolymer for lithium/sulfur
battery

AU Shin, J. H.; Jung, S. S.; Kim, K. W.; Ahn, H. J.; Ahn, J. H.

CS Advanced Materials Research Institute, Department of Metallurgical
and Materials Engineering, Gyeongsang National University, Jinju,
660-701, S. Korea

SO Journal of Materials Science: Materials in Electronics (2002
, 13(12), 727-733

CODEN: JSMEEV; ISSN: 0957-4522

PB Kluwer Academic Publishers

DT Journal

LA English

AB PVdF-TG-LiX polymer electrolytes comprised of polyvinylidene fluoride (PVdF)-hexafluoropropylene (HFP) copolymer, tetra(ethylene glycol) di-Me ether as plasticizer, LiCF₃SO₃, LiBF₄ and LiPF₆ as lithium salt and acetone as solvent have been prepd. by solvent casting of slurry that mixed PVdF-HFP copolymer with acetone and salt using a ball-milling technique, which was performed for 2 and 12 h with a ball-to-material ratio of 400:1, and their electrochem. and thermal properties were studied. The ball-milled PVdF-TG-LiX polymer electrolytes have higher ionic cond. as well as lower glass transition temp. and m.ps. than the magnetically stirred one. The PVdF-TG-LiPF₆ polymer electrolytes prepd. by ball-milling, for, 12 h, in particular, resulted in a max. value in the ionic cond., which was 4.99×10^{-4} S cm⁻¹ at room temp. The ball-milled PVdF-TG-LiX polymer electrolytes were introduced into Li/S cells with sulfur as cathode and lithium as the anode. The first specific discharge capacities with a discharge rate of 0.14 mA cm⁻² at room temp. were about 575 and 765 mA h g-cathode⁻¹ for magnetic stirring and 12 h ball milling.

CC 76-2 (Electric Phenomena)

Section cross-reference(s): 72

ST polymer electrolytes lithium sulfur
battery

IT Secondary batteries

(lithium/sulfur; prepn. and characterization
of plasticized polymer electrolytes based on PVdF-HFP copolymer
for lithium/sulfur battery)

IT 9011-17-0P

(prepn. and characterization of plasticized polymer electrolytes
based on PVdF-HFP copolymer for lithium/sulfur

battery)

RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 7 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 116:155441 HCA Full-text

TI Preparation of lithium ion-conducting solid electrolytes by reaction
of lithium iodide with alkylurotropin iodide

IN Lobitz, Peter; Strebelow, Martina; Fuellbier, Harry; Stegemann,
Harald; Wolf, Ruediger; Brackmann, Ernst

PA Ernst-Moritz-Arndt-Universitaet, Germany

SO Ger. (East), 8 pp.

CODEN: GEXXA8

DT Patent

LA German

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DD 294598	A5	19911002	DD 1985-283296 198511 26	

PRAI DD 1985-283296 19851126 <--

OS MARPAT 116:155441

AB The electrolyte contg. 15-95 mol% LiI is prepd. by reaction of LiI with N-C1-10 alkylarotropin (mono-hepta)iodide in a closed vessel at 40-200° (preferably 60-120°) for 0.5-100 h. The reaction mixt. also can contain addnl. I. The elec. cond. of the electrolyte at 20-80° is considerably higher than that of the initial reactants. The electrolyte is used as protective layers of anodes in sealed maintenance-free Li batteries. Several electrolytes were prepd. and their elec. conds. at 60° were $3.7 + 10^{-5}$ - $3.28 + 10^{-4}$ S/cm.

IT 7439-93-2, Lithium, uses
(anodes, protection of, electrolytes from reaction of
lithium iodide with alkylurotropin iodide for, in batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-60

ICS H01B001-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76

ST alkylurotropin lithium iodide battery electrolyte; elec cond
alkylurotropin lithium iodide; lithium anode protection
alkylurotropin lithium iodide

IT Electric conductivity and conduction
(of reaction products of alkylurotropin iodides with lithium
iodide, for electrolytes in lithium batteries)

IT Anodes
(battery, lithium, protection of, electrolytes from reaction of
lithium iodide with alkylurotropin iodide for)

IT 7439-93-2, Lithium, uses
(anodes, protection of, electrolytes from reaction of

lithium iodide with alkylurotropin iodide for, in batteries)
 IT 5406-76-8DP, reaction products with lithium iodide 10377-51-2DP,
 Lithium iodide, reaction products with alkylurotropin iodides
 50982-79-1DP, reaction products with lithium iodide 108203-73-2DP,
 reaction products with lithium iodide
 (electrolytes, elec. cond. and prepn. of, for protection of
 lithium anodes in batteries)

L28 ANSWER 8 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 106:21099 HCA Full-text

TI Protected electrode material and its forming

IN McLoughlin, Robert Hamilton; Park, George Barry; Cook, John Anthony

PA Raychem Ltd., UK

SO Eur. Pat. Appl., 16 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI EP 195684	A2	19860924	EP 1986-302097	19860321
	<--			
EP 195684	A3	19880113		
EP 195684	B1	19910502		
	R: AT, BE, CH, DE, FR, GB, IT, LI, NL, SE			
JP 61220272	A	19860930	JP 1986-64662	19860320
	<--			
IL 78220	A	19891215	IL 1986-78220	19860321
	<--			
CA 1274276	A1	19900918	CA 1986-504736	19860321
	<--			
AT 63181	T	19910515	AT 1986-302097	19860321
	<--			
US 4675258	A	19870623	US 1986-924122	19861030
	<--			
PRAI GB 1985-7510	A	19850322	<--	
US 1986-841914	A1	19860320	<--	
EP 1986-302097	A	19860321	<--	

AB The title material comprises a sensitive electrode material having a layer of protective material bonded to at least part of its surface by an adhesive which can be swollen by treatment with a liq. to increase the permeability of the adhesive to electrolyte, which is encountered by the protected electrode material when incorporated in an electrochem. device. Poly(ethylene oxide) (PEO) was extruded continuously on Li foil at 120-140° and passed between chilled nip rolls to produce a uniform 0.15-mm-thick coating. After irradiating the encapsulated Li to 15 Mrads with an electron beam at 25°, a

layer of microporous polypropylene (Celgard 2400) was adhered to each side of the encapsulated Li by pressure lamination using nip rolls heated to 75°. Immersion of the resultant laminate into a 0.5M LiClO₄ in 1:1:1 MeOC₂H₄OMe-propylene carbonate electrolyte caused the PEO to swell to a thickness of 0.5 mm without detachment of the polypropylene. The cond. of the PEO-polypropylene coating in the same electrolyte was 10⁻³/Ω-cm.

IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, forming of protected, for batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-02

ICS H01M002-14; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 76

ST polypropylene polyethylene oxide lithium anode; battery
anode lithium protection; elec cond polypropylene
polyethylene oxide

IT Electric conductivity and conduction
(of poly(ethylene oxide)-polypropylene, on lithium, in org.
electrolyte)

IT Anodes
(battery, lithium, forming of protected)

IT 9003-07-0, Polypropylene
(anodes protected with, lithium, forming of, for
batteries)

IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, forming of protected, for batteries)

IT 25322-68-3, Poly(ethylene oxide)
(crosslinked, anodes contg. adhesive of, lithium,
forming of protected, for batteries)

L28 ANSWER 9 OF 9 HCA COPYRIGHT 2007 ACS on STN

AN 66:111055 HCA Full-text

TI Lithium-sulfur battery

PA Societe des Accumulateurs Fixes et de Traction

SO Fr., 3 pp.

CODEN: FRXXAK

DT Patent

LA French

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	FR 1456556	19661028	FR 1965-22971	
			196506	
			30	

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AB A battery was described having a sintered Ni cathode impregnated with 0.2-0.6 g. S/cm.³, an electrolyte soln. of LiClO₄, MeSSMe, and Et₃N dissolved in Me₂SO, and a Li anode. The battery had a capacity of 150 w. hr./kg. of electrodes. A battery with a 96-cm.² cathode and a 48-cm.² anode 1-mm. apart, had a voltage of 1.8 v. when discharged through a 50-ohm load.

IC H01M
CC 77 (Electrochemistry)
IT Anodes
(battery, of fritted nickel impregnated with sulfur)
IT Batteries, primary
(lithium-nickel (sulfur-impregnated))
IT 7704-34-9, uses and miscellaneous
(anodes from fritted nickel impregnated with, for
lithium-nickel battery)

=> D L29 1-17 BIB ABS HITSTR HITIND

L29 ANSWER 1 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 142:243644 HCA Full-text

TI Lithium-sulfur battery

IN Kim, Ju-yup; Ryu, Young-gyoon

PA S. Korea

SO U.S. Pat. Appl. Publ., 12 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2005042503	A1	20050224	US 2004-921850	
			200408	
			20	
		<--		
JP 2005071999	A	20050317	JP 2004-239921	
			200408	
			19	
		<--		
CN 1610167	A	20050427	CN 2004-10083285	
			200408	
			23	
		<--		
PRAI KR 2003-58506	A	20030823	<--	

AB A lithium-sulfur battery includes a cathode, a lithium metal anode, and a separator interposed between the cathode and the anode. The separator contains less than two fluorine atoms per carbon atom to enable a protective layer to form on a surface of the lithium metal anode. The lithium-sulfur battery forms a uniform and dense LiF protective layer on the surface of the lithium metal and stabilizes the lithium metal during its operation. The lithium-sulfur battery prevents the formation of lithium dendrites and inhibits the decompn. of an electrolytic soln. to provide improved cycle characteristics and excellent charging/discharging efficiency. In addn., the lithium-sulfur battery blocks the reaction of polysulfide with the surface of lithium metal to prevent a redn. of the lifetime of the battery.

IC ICM H01M002-16

ICS H01M004-60; H01M004-40; H01M004-58

INCL 429137000; 429247000; 429101000; 429213000; 429254000; 429231950

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

ST lithium sulfur battery

IT Dendrites (crystal)

Secondary battery separators

(lithium-sulfur battery with

prevention of lithium dendrites formation)

- IT Fluoropolymers, uses
(lithium-sulfur battery with prevention of lithium dendrites formation)
- IT Carbon black, uses
(lithium-sulfur battery with prevention of lithium dendrites formation)
- IT Secondary batteries
(lithium; lithium-sulfur battery with prevention of lithium dendrites formation)
- IT 7631-86-9, Fumed silica, uses
(colloidal, filler; lithium-sulfur battery with prevention of lithium dendrites formation)
- IT 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane 646-06-0, 1,3-Dioxolane 7439-93-2, Lithium, uses 7704-34-9D, Sulfur, org. compd. 9002-83-9, Polychlorotrifluoroethylene 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 10544-50-0, Sulfur s8, uses 24937-79-9, PvdF 24981-14-4, Polyvinylfluoride 25038-71-5, Ethylene-tetrafluoroethylene copolymer 25101-45-5, Ethylene-chlorotrifluoroethylene copolymer 25120-58-5, Hexafluoropropylene-vinyl fluoride copolymer 25684-78-0, Ethylene-vinylidene fluoride copolymer 26008-14-0, Ethylene-vinyl fluoride copolymer 33454-82-9, Lithium triflate 69822-67-9, Poly(carbon sulfide) 74432-42-1, Lithium polysulfide
(lithium-sulfur battery with prevention of lithium dendrites formation)
- IT 75-05-8, Acetonitrile, uses 9011-14-7, Pmma
(lithium-sulfur battery with prevention of lithium dendrites formation)
- IT 7789-24-4, Lithium fluoride, uses
(protective layer; lithium-sulfur battery with prevention of lithium dendrites formation)

L29 ANSWER 2 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 142:138256 HCA [Full-text](#)

TI Lithium sulfur secondary battery

IN Choi, Su Seok; Choi, Yun Seok; Hwang, Deok Cheol; Jung, Yong Ju; Kim, Ju Seok; Lee, Je Wan; Noh, Hyeong Gon; Park, Jin

PA Samsung SDI Co., Ltd., S. Korea

SO Repub. Korean Kongkae Taeho Kongbo, No pp. given

CODEN: KRXXA7

DT Patent

LA Korean

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI KR 2002018395	A	20020308	KR 2000-51684 200009 01	

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PRAI KR 2000-51684 20000901 <--

AB A lithium sulfur secondary battery is provided to improve the lifetime and the capacitance by enhancing the cond. of an anode plate by employing a polymer film coating the active material of an anode. The lithium sulfur secondary battery comprises an anode employing an active material selected from the group consisting of sulfur(S8), lithium sulfide and

lithium polysulfide; a cathode employing a lithium metal or a lithium alloy; and a polymer film which is ion-conductive and elec. conductive and coats the cathode active material. Preferably the polymer film contains further carbon or metal powder and has a thickness of 20 μm or less. The polymer film is selected from the group consisting of polyvinylidene fluoride, a copolymer of polyvinylidene fluoride and hexafluoropropene, poly(Me methacrylate), poly(vinyl acetate), poly(vinyl butyral-co-vinyl alc.-co-vinyl acetate), poly(Me methacrylate-co-Et acrylate), polyacrylonitrile, poly(ethylene oxide), a copolymer of vinyl chloride and vinyl acetate, poly(vinyl alc.), poly(1-vinyl pyrrolidone-co-vinyl acetate), cellulose acetate and poly(vinyl pyrrolidone).

IC ICM H01M004-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

ST **lithium sulfur secondary battery**

IT Conducting polymers

(coatings, ionically and elec. conducting; **lithium sulfur secondary battery**)

IT Polyvinyl butyrals

(copolymers with vinyl alc. and vinyl acetate; **lithium sulfur secondary battery**)

IT **Battery cathodes**

Electric conductivity

(**lithium sulfur secondary battery**)

IT Fluoropolymers, uses

Polyoxyalkylenes, uses

(**lithium sulfur secondary battery**)

IT Secondary batteries

(**lithium; lithium sulfur secondary battery**)

IT **Battery anodes**

(polymer-encapsulated; **lithium sulfur secondary battery**)

IT Vinyl compounds, uses

(polymers, carbon or metal composites, film coating; **lithium sulfur secondary battery**)

IT 10544-50-0, Sulfur (S8), uses 12136-58-2, Lithium sulfide (Li₂S)

74432-42-1, Lithium sulfide (Li₂(S_x))

(**anode; lithium sulfur secondary battery**)

IT 9002-89-5, Polyvinyl alcohol 9003-20-7, Polyvinyl acetate

9003-22-9, Poly(vinyl acetate-vinyl chloride) 9003-39-8,

Poly(vinylpyrrolidone) 9004-35-7 9010-88-2, Ethyl

acrylate-methyl methacrylate copolymer 9011-14-7 9011-17-0

24937-79-9, Polyvinylidene fluoride 25014-41-9 25086-89-9

25322-68-3, Poly(ethylene oxide)

(carbon or metal composites, film coating; **lithium sulfur secondary battery**)

IT 7439-93-2, Lithium, uses 7439-93-2D, Lithium, alloys

(cathode; **lithium sulfur secondary battery**)

L29 ANSWER 3 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 142:117693 HCA [Full-text](#)

TI Method of fabrication of anode for rechargeable lithium battery

IN Cho, Chung-Kun; Hwang, Duck-Chul; Hwang, Seung-Sik; Lee, Sang-Mock

PA Samsung SDI Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 11 pp.

CODEN: USXXCO

DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2005008938	A1	20050113	US 2004-778319	20040217
		<--		
KR 2005007484	A	20050119	KR 2003-46160	20030708
CN 1577919	A	20050209	CN 2004-10047712	20040305
		<--		
JP 2005044796	A	20050217	JP 2004-200674	20040707
		<--		

PRAI KR 2003-46160 A 20030708 <--

AB A neg. electrode of a rechargeable lithium battery includes a current collector, a neg. active material layer on one side of the current collector, a protection layer on the neg. active material and a releasing layer on the other side of the current collector, or on the protection layer.

IC ICM H01M002-16

ICS H01M002-18

INCL 429246000; 429144000; 429249000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST anode fabrication rechargeable lithium battery

IT Conducting polymers

(layer; method of fabrication of anode for rechargeable lithium battery)

IT Phosphazenes

Polyesters, uses

Polyimides, uses

(layer; method of fabrication of anode for rechargeable lithium battery)

IT Fluoropolymers, uses

(layer; method of fabrication of anode for rechargeable lithium battery)

IT Polyolefins

(layer; method of fabrication of anode for rechargeable lithium battery)

IT Polyoxyalkylenes, uses

(layer; method of fabrication of anode for rechargeable lithium battery)

IT Secondary batteries

(lithium, Li-S; method of fabrication of anode for rechargeable lithium battery)

IT Battery anodes

(method of fabrication of anode for rechargeable lithium battery)

IT Polysiloxanes, uses

(method of fabrication of anode for rechargeable lithium battery)

IT Alkadienes
 (polymers, layer; method of fabrication of anode for rechargeable lithium battery)

IT Plasma
 (treatment; method of fabrication of anode for rechargeable lithium battery)

IT 9002-88-4, Polyethylene 9003-07-0, Polypropylene
 (layer; method of fabrication of anode for rechargeable lithium battery)

IT 7440-21-3D, Silicon, compd.
 (layer; method of fabrication of anode for rechargeable lithium battery)

IT 554-13-2, Lithium carbonate 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-93-2, Lithium, uses 7439-95-4, Magnesium, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-09-7, Potassium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-23-5, Sodium, uses 7440-24-6, Strontium, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-39-3, Barium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-56-4, Germanium, uses 7440-57-5, Gold, uses 7440-66-6, Zinc, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses 10377-52-3, Lithium phosphate 10544-50-0, Sulfur s8, uses 12627-14-4, Lithium silicate 12676-27-6 26134-62-3, Lithium nitride 37220-89-6, Lithium aluminate 39302-37-9, Lithium titanium oxide 152747-89-2, Lanthanum lithium oxide 184905-46-2, Lithium nitrogen phosphorus oxide 188596-59-0, Syl-off 7922 236388-73-1, Lithium silicide sulfide 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum lithium sulfide 236388-76-4, Lithium phosphide sulfide 342379-43-5, Germanium lithium sulfide (method of fabrication of anode for rechargeable lithium battery)

IT 25038-59-9, uses
 (method of fabrication of anode for rechargeable lithium battery)

IT 124-38-9, Carbon dioxide, uses 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen, uses
 (plasma; method of fabrication of anode for rechargeable lithium battery)

L29 ANSWER 4 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 140:29502 HCA [Full-text](#)

TI Nonaqueous electrolyte batteries with high energy density and charge-discharge efficiency

IN Fujimoto, Yuki; Nakagawa, Hiroe; Nukuta, Toshiyuki

PA Yuasa Corporation, Japan

SO Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003346899	A	20031205	JP 2002-156599	

PI JP 2003346899 A 20031205 JP 2002-156599

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PRAI JP 2002-156599 20020530 <--

OS MARPAT 140:29502

AB The batteries, useful for secondary lithium batteries, contain S- and/or N-contg. fluoroalkyl compds. (e.g., F-contg. sulfonate esters, sulfate esters, amides) in nonaq. electrolytes. The org. compds. prevent degrdn. of propylene carbonate by forming Li ion-permeable protective films on anodes at first charging.

IC ICM H01M010-40

ICS H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 7782-42-5, Graphite, uses

(anodes; nonaq. electrolyte batteries contg. S- and/or N-contg. fluoroalkyl compds. in electrolytes showing high energy d. and charge-discharge efficiency)

L29 ANSWER 5 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 139:216878 HCA Full-text

TI Effect of Multiwalled Carbon Nanotubes on Electrochemical Properties of Lithium/Sulfur Rechargeable Batteries

AU Han, Sang-Cheol; Song, Min-Sang; Lee, Ho; Kim, Hyun-Seok; Ahn, Hyo-Jun; Lee, Jai-Young

CS Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Daejeon, 305-701, S. Korea

SO Journal of the Electrochemical Society (2003), 150(7), A889-A893

CODEN: JESOAN; ISSN: 0013-4651

PB Electrochemical Society

DT Journal

LA English

AB To bestow high electronic cond. and prevent dissoln. of sulfur into the electrolyte, multi-walled carbon nanotubes (MWNTs) were prepd. by thermal CVD as an inactive additive material for elemental sulfur pos. electrodes for lithium/sulfur rechargeable batteries. The initial discharge capacity of elemental sulfur pos. electrode with MWNT is 485 mAh/g sulfur at 2.0 V vs. Li/Li+. The cycle life and rate capability of sulfur cathode is increased with addn. of MWNT. The MWNT shows a vital role on polysulfide adsorption and is a good elec. conductor for a sulfur cathode.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 49, 76

ST multiwalled carbon nanotube cond lithium sulfur rechargeable battery CVD

IT Fluoropolymers, uses

(blend with sulfur and acetylene black; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)

IT Carbon black, uses

(blend with sulfur and polyvinylidene difluoride; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)

)

IT Nanotubes

(carbon, multi-walled; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)

IT Vapor deposition process

(chem.; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)

- IT Polysulfides
(effect of MWNTs on retention of lithium polysulfides at electrodes of lithium sulfur battery)
- IT Battery cathodes
Cyclic voltammetry
Electric conductivity
Electric current-potential relationship
(effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT Secondary batteries
(lithium/sulfur; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT Thermal decomposition
(of methane; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 7440-44-0P, Carbon, uses
(MWNTs; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 7704-34-9, Sulfur, uses
(blend with acetylene black and polyvinylidene difluoride; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 24937-79-9
(blend with sulfur and acetylene black; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 1333-74-0, Hydrogen, reactions
(catalyst redn. and MWNT feed gas; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 122327-06-4P, Magnesium nickel oxide (Mg_{0.6}Ni_{0.4}O)
(effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 74-82-8, Methane, uses
(effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 77-92-9, Citric acid, reactions 13446-18-9, Magnesium nitrate, hexahydrate 13478-00-7
(effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 143-24-8, Tetraglyme 90076-65-6, Lithium bis(trifluoromethane sulfonyl)imide
(electrolyte; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 7439-93-2, Lithium, uses
(foil, anode; effect of multi-walled carbon nanotubes

on electrochem. properties of lithium/sulfur
rechargeable batteries)

IT 7429-90-5, Aluminum, uses
(foil, cathode substrate; effect of multi-walled carbon nanotubes
on electrochem. properties of lithium/sulfur
rechargeable batteries)

IT 9003-07-0, Celgard 2200
(porous, separator; effect of multi-walled carbon nanotubes on
electrochem. properties of lithium/sulfur
rechargeable batteries)

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L29 ANSWER 6 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 131:312496 HCA Full-text

TI Encapsulated lithium electrodes having glass protective
layers and method for their preparation

IN Visco, Steve J.; Tsang, Floris Y.

PA Polyplus Battery Company, Inc., USA

SO PCT Int. Appl., 33 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 15

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI WO 9957770	A1	19991111	WO 1999-US6895	
			199903	
			29	

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W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ,
DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN,
IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD,
MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI,
SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW

RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE,
DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ,
CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 6214061	B1	20010410	US 1998-139601	
			199808	
			25	

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CA 2330293	A1	19991111	CA 1999-2330293	
			199903	
			29	

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AU 9933713	A	19991123	AU 1999-33713	
			199903	
			29	

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AU 745287	B2	20020321		
EP 1093672	A1	20010425	EP 1999-915119	
			199903	
			29	

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EP 1093672 B1 20040825
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO

BR 9910109 A 20011009 BR 1999-10109
199903
29

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JP 2002513991 T 20020514 JP 2000-547661
199903
29

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AT 274752 T 20040915 AT 1999-915119
199903
29

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US 6432584 B1 20020813 US 2000-678063
200010
02

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MX 2000PA10743 A 20010419 MX 2000-PA10743
200011
01

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PRAI US 1998-83947P P 19980501 <--
US 1998-139601 A 19980825 <--
WO 1999-US6895 W 19990329 <--

AB A method for fabricating an active metal electrode involves depositing lithium or other active metal electrode on a protective layer. The protective layer is a glassy or amorphous material that conducts ions of the active metal. It may be deposited on a releasable web carrier or other substrate such as polymer electrolyte layer. Lithium is then deposited on the protective layer. Finally, a current collector is attached to the lithium.

IC ICM H01M004-02

ICS H01M004-04; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

ST lithium sulfur battery anode
encapsulation

IT Secondary batteries
(Li-S; encapsulated lithium
electrodes having glass protective layers and
method for their prepn.)

IT Battery anodes
Encapsulation
Polymer electrolytes
(encapsulated lithium electrodes having glass protective
layers and method for their prepn.)

IT Polyethers, uses
Polymers, uses
Polyphosphazenes
Polythioethers
(gel electrolyte contg.; encapsulated lithium electrodes having
glass protective layers and method for their
prepn.)

IT Polyoxyalkylenes, uses
(gel or solid electrolyte contg.; encapsulated lithium electrodes
having glass protective layers and method for
their prepn.)

IT Battery electrolytes
 (gel; encapsulated lithium electrodes having glass
 protective layers and method for their prepn.)

IT Imines
 (polyimines, gel electrolyte contg.; encapsulated lithium
 electrodes having glass protective layers and
 method for their prepn.)

IT 7440-02-0, Nickel, uses 12597-68-1, Stainless steel, uses
 (current collector; encapsulated lithium electrodes having glass
 protective layers and method for their prepn.)

IT 7439-93-2, Lithium, uses
 (encapsulated lithium electrodes having glass protective
 layers and method for their prepn.)

IT 10377-52-3, Lithium phosphate 12627-14-4, Lithium silicate
 12676-27-6 37220-89-6, Lithium aluminate 184905-46-2, Lithium
 nitrogen phosphorus oxide 236388-73-1, Lithium silicide sulfide
 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum Lithium
 sulfide 236388-76-4, Lithium phosphide sulfide
 (protective layer contg.; encapsulated
 lithium electrodes having glass protective
 layers and method for their prepn.)

IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7440-31-5, Tin,
 uses 7440-50-8, Copper, uses 7440-66-6, Zinc, uses
 (releasable web carrier; encapsulated lithium electrodes having
 glass protective layers and method for their
 prepn.)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L29 ANSWER 7 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 126:345316 HCA [Full-text](#)

TI The role of SO₂ as an additive to organic Li-ion battery
 electrolytes

AU Ein-Eli, Y.; Thomas, S. R.; Koch, V. R.

CS Covalent Associates Incorporated, Woburn, MA, 01801, USA

SO Journal of the Electrochemical Society (1997), 144(4),
 1159-1165

CODEN: JESOAN; ISSN: 0013-4651

PB Electrochemical Society

DT Journal

LA English

AB Previous work has shown that the addn. of a large amt. of SO₂ (.apprx.20 wt.%) promotes the reversible intercalation-deintercalation of Li ions into graphite in selected nonaq. electrolytes. These electrolytes were previously considered to be incompatible with graphite neg. electrodes because of solvent-graphite interaction, which led to catastrophic graphite exfoliation of the graphitic structure. We have performed a series of cond. studies along with electrochem. expts. at varying SO₂ concns. The electrolyte solns. were composed of either 1M LiAsF₆ or 1M LiPF₆. We found that the specific conductance values of the org. electrolytes contg. SO₂ were increased dramatically. Cyclic voltammetry and Fourier transform IR measurements show that the use of SO₂ as an additive to the org. solns., even at very low levels, offers the advantage of forming fully developed passive films on the graphite electrode at potentials much higher than that of the electrolyte redn. itself. These graphite surface films are composed of mixts. of SO₂ and solvent redn. products. The SO₂ redn. products are primarily responsible for the improved characteristics of the Li-ion cells contg. these SO₂-based electrolytes.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST sulfur dioxide additive lithium ion
 battery

IT Battery electrolytes

Electric conductivity

(role of SO₂ as an additive to org. Li-ion battery electrolytes)

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L29 ANSWER 8 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 119:121207 HCA [Full-text](#)

TI Lithium-cycling efficiency in inorganic electrolyte solution

AU Duenger, H. J.; Hambitzer, G.; Lutter, W.

CS Fraunhofer-Inst. Chem. Technol., Pfanzelt, D-75071, Germany

SO Journal of Power Sources (1993), 44(1-3), 405-8

CODEN: JPSODZ; ISSN: 0378-7753

DT Journal

LA English

AB The cycling efficiency and corrosion rate of Li electrodes were measured in half cells. The electrolyte soln. used was LiAlCl₄ and SO₂ with cond. of 2.2 mS/cm at -25° and 98 mS/cm at 60°. The Li cycling efficiency was .apprx.98% at 40 mA/cm² for ≥50 cycles. Depending on improved electrolyte prepn., the c.d. for Li corrosion could be reduced from 12.1 to 6.5 μA/cm². The results indicate stability, compatibility, and high-rate capability of the Li/inorg. electrolyte soln. system.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium anode cycling inorg electrolyte;
tetrachloroaluminate electrolyte lithium cycling efficiency; sulfur
dioxide electrolyte lithium cycling efficiency

IT Battery electrolytes
(lithium tetrachloroaluminate-sulfur dioxide,
lithium cycling efficiency and corrosion rate in)

IT Electric conductivity and conduction
(of lithium tetrachloroaluminate-sulfur dioxide electrolyte,
temp. effect on)

IT Anodes
(battery, lithium for, cycling efficiency of, in lithium
tetrachloroaluminate-sulfur dioxide)

IT 7439-93-2, Lithium, reactions
(cycling efficiency and corrosion rate of, in lithium
tetrachloroaluminate-sulfur dioxide electrolyte, for
anodes for batteries)

L29 ANSWER 9 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 111:118135 HCA [Full-text](#)

TI An electrochemical investigation of the temperature dependence of
inorganic electrolytes in rechargeable lithium batteries

AU Lee, T. J.; Fey, G. T. K.; Yao, P. C.; Chen, S. Y.

CS Dep. Chem. Eng., Natl. Cent. Univ., Chungli, 32054, Taiwan

SO Journal of Power Sources (1989), 26(3-4), 511-17

CODEN: JPSODZ; ISSN: 0378-7753

DT Journal

LA English

AB The effect of temp. on the stability of LiAlCl₄/SO₂ and LiGaCl₄/SO₂ electrolytes was studied by cyclic voltammetry and cond. methods using a Pt electrode; the effect of temp. on the cond. of films on Li electrodes was studied by an a.c. impedance technique. LiGaCl₄ had better cond. and was more stable than LiAlCl₄. For both electrolytes at <25°, the cond. increased with temp., but at >25°, the cond. decreased with increasing temp. The implication of a change in the ionic transport mechanism is discussed.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72, 76

ST lithium battery inorg electrolyte stability; chloroaluminate lithium
electrolyte battery; chlorogallate lithium electrolyte battery;

sulfur dioxide lithium battery
electrolyte

- IT Batteries, secondary
(lithium-sulfur dioxide, stability of lithium tetrachloroaluminate and lithium tetrachlorogallate in, temp. effect on)
- IT Electric conductivity and conduction
(of lithium tetrachloroaluminate or lithium tetrachlorogallate in sulfur dioxide, in lithium secondary batteries)
- IT Passivation
(electrochem., of lithium anodes, in lithium tetrachloroaluminate or lithium tetrachlorogallate electrolyte, in sulfur dioxide battery)
- IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, passivated, elec. cond. of, in lithium tetrachloroaluminate and lithium tetrachlorogallate electrolytes, in sulfur dioxide battery)

L29 ANSWER 10 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 111:42824 HCA [Full-text](#)

TI Lithium-sulfur battery: Evaluation of
dioxolane-based electrolytes

AU Peled, E.; Sternberg, Y.; Gorenshtein, A.; Lavi, Y.

CS Sackler Fac. Exact Sci., Tel Aviv Univ., Tel Aviv-Jaffa, 69978,
Israel

SO Journal of the Electrochemical Society (1989), 136(6),
1621-5

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

AB The elec. cond. of THF-PhMe-Li₂S₆-LiClO₄ electrolytes for Li/S batteries increased by an order of magnitude when dioxolane was added; the Li anode was compatible with the electrolyte and corrosion/self-discharge of the anode was prevented. The S utilization in the battery decreased considerably, due to the energy of formation of Li₂S₂ as discharge product, compared to Li₂S formation in electrolytes not contg. dioxolane.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST dioxolane electrolyte lithium sulfur
battery; anode lithium stability dioxolane
electrolyte; cond lithium perchlorate dioxolane electrolyte

IT Batteries, secondary
(lithium-sulfur, dioxolane-THF-toluene-
lithium perchlorate-lithium sulfide electrolytes in)

IT Electric conductivity and conduction
(of dioxolane-THF-toluene-lithium perchlorate-lithium sulfide
electrolytes, for lithium-sulfur
batteries)

IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, corrosion/self-discharge of, prevention of,
dioxolane-contg. electrolyte for, in lithium/
sulfur batteries)

IT 108-88-3, Toluene, uses and miscellaneous 109-99-9, THF, uses and
miscellaneous 646-06-0, Dioxolane 7791-03-9, Lithium perchlorate
(LiClO₄) 115681-11-3, Lithium sulfide (Li₂(S₆))
(electrolytes contg., elec. cond. of, lithium-
sulfur battery performance in relation to)

IT 12136-58-2P, Lithium sulfide (Li₂S) 51148-09-5P, Lithium sulfide (Li₂(S₂))
(formation of, in discharge of **lithium-sulfur battery**, dioxolane-contg. electrolyte in relation to)

L29 ANSWER 11 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 111:42823 HCA [Full-text](#)

TI Inorganic electrolyte lithium/cupric chloride rechargeable cell

AU Dey, A. N.; Bowden, W. L.; Kuo, H. C.; Gopikanth, M. L.; Schlaikjer, C.; Foster, D.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Journal of the Electrochemical Society (1989), 136(6), 1618-21

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

AB A rechargeable Li/CuCl₂ battery with LiAlCl₄-3SO₂ electrolyte has a highly reversible Li-solvent chem. with a Li turnover figure of merit of ≤ 194 and a capacity of 7-8 A-h. The reversibility of the electrolyte-Li reaction allows the use of systematic overcharge to eliminate irreversible loss of Li and to provide for cell balancing.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium cupric chloride rechargeable battery; sulfur dioxide lithium chloroaluminate electrolyte; electrolyte lithium anode reversible reaction

IT Electric conductivity and conduction

(of lithium tetrachloroaluminate-sulfur dioxide electrolyte, temp. effect on)

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl₄)

(electrolytes, contg. **sulfur dioxide**, in **lithium-cupric chloride batteries**)

L29 ANSWER 12 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 110:26607 HCA [Full-text](#)

TI New highly conductive inorganic electrolytes. The liquid sulfur dioxide solvates of the alkali and alkaline earth metal tetrachloroaluminates

AU Foster, D. L.; Kuo, H. C.; Schlaikjer, C. R.; Dey, A. N.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Journal of the Electrochemical Society (1988), 135(11), 2682-6

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

AB The liq. SO₂ solvates of the tetrachloroaluminate of Li, Na, Ca, and/or Sr are highly conductive (.apprx. 10⁻¹/Ω-cm) inorg. electrolytes with low SO₂ vapor pressure. The addn. of the SO₂ solvate of NaAlCl₄, Ca(AlCl₄)₂, or Sr(AlCl₄)₂ to LiAlCl₄:3SO₂ lowers the f.p. considerably. The Li stability at elevated temps. is best in electrolytes with higher SO₂ content such as LiAlCl₄:6SO₂, or SO₂ solvate electrolyte contg. NaAlCl₄, than that of an electrolyte contg. pure LiAlCl₄:3SO₂.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 76

IT Batteries, secondary

(**lithium-sulfur dioxide**, **sulfur dioxide solvates of alkali metal and alk. earth tetrachloroaluminates as electrolytes for**)

IT Electric conductivity and conduction

Vapor pressure

(of sulfur dioxide solvates of alkali metal and alk. earth tetrachloroaluminates, for battery electrolytes)

IT 7439-93-2, Lithium, reactions

(anodes, corrosion of, in sulfur dioxide solvates of alkali metal and alk. earth tetrachloroaluminate electrolytes, for batteries)

L29 ANSWER 13 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 109:84148 HCA [Full-text](#)

TI Effect of the nature of a salt on the interaction of sulfur dioxide with nonaqueous electrolytes

AU Shembel, E. M.; Apostolova, R. D.; Es'kova, N. I.

CS Dnepropetr. Khim.-Tekhnol. Inst., Dnepropetrovsk, USSR

SO Zhurnal Prikladnoi Khimii (Sankt-Peterburg, Russian Federation) (1988), 61(5), 1142-4

CODEN: ZPKHAB; ISSN: 0044-4618

DT Journal

LA Russian

AB In connection with the use of SO₂ as an electrolyte in high-energy-capacity batteries with Li anodes, the title effect was studied. The effect was investigated of the SO₂ content on the elec. cond. of the solns., and the IR spectroscopic characteristics of the solns. were compared. The aprotic solvents studied were propylene carbonate, MeCN, DMSO, and DMF, while the salts were LiClO₄ and Bu₄NClO₄. The interaction of the components of a nonaq. electrolyte with SO₂ has a complex nature, which one must take into account in optimizing the electrolyte compn. of a nonaq. battery.

CC 76-1 (Electric Phenomena)

Section cross-reference(s): 52, 73

IT Batteries, primary

(lithium-sulfur dioxide, perchlorate salt effect on sulfur dioxide interaction with nonaq. electrolyte in)

IT Electric conductivity and conduction

(of nonaq. electrolytes contg. perchlorate salts, sulfur dioxide concn. effect on)

L29 ANSWER 14 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 107:25970 HCA [Full-text](#)

TI New highly conductive inorganic electrolytes. The liquid sulfur dioxide solvates of the alkali and alkaline earth metal tetrachloroaluminates

AU Foster, D. L.; Kuo, H. C.; Schlaikjer, C. R.; Kallianidis, M.; Dey, A. N.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Proceedings - Electrochemical Society (1987), 87-1(Proc.

Symp. Lithium Batteries, 1986), 477-89

CODEN: PESODO; ISSN: 0161-6374

DT Journal

LA English

AB LiAlCl₄-SO₂ electrolytes for batteries have a cond. of .apprx.0.1/Ω-cm at ambient temp. The cond. max. is obsd. for LiAlCl₄.6SO₂. The equil. vapor pressure of SO₂ over LiAlCl₄.3SO₂ is <1 atm. at room temp. LiAlCl₄.6SO₂ remains in a liq. state even at -30°. The addn. of the SO₂ solvate of NaAlCl₄, Ca(AlCl₄)₂, or Sr(AlCl₄)₂ to LiAlCl₄.3SO₂ lowers the f.p. considerably. The Li stability at elevated temps. is best in electrolytes with higher SO₂ content (such as LiAlCl₄.6SO₂ or SO₂ solvate electrolyte contg. NaAlCl₄) than an electrolyte contg. LiAlCl₄.3SO₂. The Li plating-stripping efficiency is very high, esp. for electrolytes contg. only LiAlCl₄ as the electrolyte salt.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Batteries, primary

(lithium, sulfur dioxide-alkali and alk. earth metal tetrachloroaluminate complex electrolytes for, properties of)

- IT Electric conductivity and conduction
(of sulfur dioxide solvates of alkali and alk. earth metal
tetrachloroaluminates, for battery electrolytes)
- IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, cycling efficiency of, in lithium
tetrachloroaluminate-sulfur dioxide complex electrolytes)

L29 ANSWER 15 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 106:130911 HCA [Full-text](#)

TI The analysis of lithium anode surface films in the
lithium-sulfur dioxide cell using diffuse reflectance Fourier
transform infrared spectroscopy

AU Anderson, Mark

CS Jet Propul. Lab., Pasadena, CA, 91109, USA

SO Spectroscopy (Duluth, MN, United States) (1987), 2(2), 54,
56, 58

CODEN: SPECET; ISSN: 0887-6703

DT Journal

LA English

AB Diffuse reflectance Fourier transform IR spectroscopy has been used to improve the anal. of Li anode surface films in the Li/SO₂ battery. This high-energy, light-wt. cell owes its stability to a protective film on Li metal. The film chem. influences properties, such as rechargeability, self-discharge, and safety. An IR technique is described for qual. anal. of the cell that is safe, sensitive, and requires no alteration of the anode surface. This technique should have general research applications on electrochem. cells with reactive metal electrodes that are mediated by surface films.

CC 79-6 (Inorganic Analytical Chemistry)

Section cross-reference(s): 52

ST lithium anode surface film analysis; battery lithium
anode surface analysis; IR lithium anode surface
analysis; diffuse reflectance Fourier IR analysis; safety
electrochem cell analysis

IT Anodes

(lithium, anal. of surface films of, in lithium-sulfur dioxide
cells, by diffuse-reflectance Fourier-transform IR spectroscopy)

IT Batteries, primary

(lithium-sulfur dioxide, anal. of lithium
anode surface films in, by diffuse-reflectance
Fourier-transform IR spectroscopy)

IT Surface analysis

(of lithium anodes, in lithium-sulfur dioxide cells, by
diffuse-reflectance Fourier-transform IR spectroscopy)

IT 7439-93-2, Lithium, analysis

(anal. of anode surface films of, in lithium-sulfur
dioxide cells, by diffuse-reflectance Fourier-transform IR
spectroscopy)

IT 13453-87-7 15593-53-0 59744-77-3, Lithium dithionite

(detection of, on lithium anode surface films in
lithium-sulfur dioxide cells, by diffused-reflectance
Fourier-transform IR spectroscopy)

L29 ANSWER 16 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 100:159558 HCA [Full-text](#)

TI Battery with a sulfur dioxide electrolyte complex

IN Foster, Donald Lee; Kuo, Han Cheng

PA Duracell International, Inc., USA

SO Ger. Offen., 21 pp.

CODEN: GWXXBX

DT Patent
LA German
FAN.CNT I

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI DE 3328609	A1	19840209	DE 1983-3328609	19830808
	<--			
DE 3328609	C2	19911219		
CA 1210056	A1	19860819	CA 1983-432163	19830711
	<--			
IL 69266	A	19870130	IL 1983-69266	19830718
	<--			
GB 2124821	A	19840222	GB 1983-20037	19830726
	<--			
GB 2124821	B	19851211		
BE 897408	A1	19840130	BE 1983-211261	19830728
	<--			
FR 2531574	A1	19840210	FR 1983-13038	19830808
	<--			
FR 2531574	B1	19861114		
JP 59049159	A	19840321	JP 1983-145623	19830809
	<--			
JP 04035876	B	19920612		
US 4891281	A	19900102	US 1986-830231	19860213
	<--			

PRAI US 1982-405980 A 19820809 <--

AB A nonaq. battery comprises an active solid cathode, an active metal anode, and a highly conducting electrolyte of low vapor pressure. The electrolyte comprises a fluid solvate complex of SO₂ and an alkali or alk. earth salt which is sol. in SO₂ and has a Group 3A element halide anion, the ratio of salt: SO₂ in electrolyte is 1:1 to 1:7. Thus, a battery was assembled with 2 g cathode from CuCl₂ 60, graphite 3, and PTFE 10%; 2 Li anodes; and LiAlCl₄.3.1 SO₂ solvate-complex electrolyte. The battery was discharged at 4 mA to a cutoff voltage of 2.6 V and was continuously cyclically charged at 20 mA to 4.05 V. The battery was near .apprx.100% cathode capacity for 1 electron transfer at .apprx.350 cycles. The total capacity was 72 A-h at .apprx.36% Li conversion and the original theor. capacity was 0.24 A-h.

IC H01M006-14; H01M004-40; H01M004-48; H01M004-50; H01M004-58; H01M006-22

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Batteries, secondary
(copper chloride-lithium, with sulfur dioxide-electrolyte complex, performance of)

IT Electric conductivity and conduction
(of sulfur dioxide solvate complexes with aluminum metal
chlorides)

L29 ANSWER 17 OF 17 HCA COPYRIGHT 2007 ACS on STN

AN 95:46029 HCA Full-text

TI Lithium-solvent interactions in lithium/thionyl chloride and
lithium/sulfur dioxide battery systems

AU Dey, A. N.

CS Lab. Phys. Sci., Duracell Int., Inc., Burlington, MA, 01803, USA

SO Proceedings - Electrochemical Society (1980), 80-7(Proc.
Workshop Lithium Nonaqueous Battery Electrochem.), 83-97
CODEN: PESODO; ISSN: 0161-6374

DT Journal

LA English

AB The Li-solvent interactions in the Li/SOCl₂ system leads to the formation of a protective film of LiCl on Li thereby passivating the anode from further chem. attack. This results in voltage-delay of the batteries during use. The study of the kinetics of the growth and the morphol. of the film led to significant improvements in the understanding of the film growth which in turn was useful in solving the voltage-delay problem. The Li-solvent interaction in the Li/SO₂ org. electrolyte system was particularly important from a safety standpoint. The reactive species responsible for the unsafe behavior were identified, and approaches to replace those reactive species by less reactive ones and also to mitigate the reactivity by additives were developed. In general, the Li-solvent interactions play a very important role in detg. the performance and the safety of the Li batteries.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium battery solvent reaction safety; sulfur dioxide
lithium battery safety; thionyl chloride lithium
battery safety

IT Batteries, primary
(lithium-sulfur dioxide and lithium
-thionyl chloride, lithium-solvent interactions in)

IT Safety
(of lithium-sulfur dioxide and lithium
-thionyl chloride batteries, lithium-solvent
interactions in relation to)

=> D HIS L103-

FILE 'HCA' ENTERED AT 13:06:38 ON 15 AUG 2007

L103 47154 S ION##(2A)(COND# OR CONDUCT?)
L104 56 S L4 AND L103
L105 4 S L104 AND L5
L106 1 S L104 AND L30
L107 0 S L104 AND L49
L108 0 S L104 AND L50
L109 5 S L104 AND PROTECT?
L110 6 S L105-L109
L111 491 S L2 AND L3 AND L103
L112 29 S L111 AND L5
L113 4 S L111 AND L30
L114 3 S L111 AND L49
L115 0 S L111 AND L50
L116 13 S L110 OR L113 OR L114
L117 9 S L116 NOT (L28 OR L29)
L118 6 S 1840-2003/PY,PRY AND L117

L119 22 S L112 NOT (L28 OR L29 OR L118)
L120 18 S 1840-2003/PY,PRY AND L119

=> D L118 1-6 BIB ABS HITSTR HITIND

L118 ANSWER 1 OF 6 HCA COPYRIGHT 2007 ACS on STN
AN 141:126310 HCA Full-text
TI Solid secondary lithium batteries showing high charge-discharge
current density
IN Kondo, Shigeo; Kurisu, Yasuyuki; Kageyama, Hiroyuki; Takeuchi,
Tomonari; Kanno, Ryoji; Inada, Taro
PA Ion Engineering Center Corp., Japan; National Institute of Advanced
Industrial Science and Technology
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004206942	A	20040722	JP 2002-372272	20021224

PRAI JP 2002-372272 20021224 <--

AB In the batteries, solid electrolytes comprise first low- ionic-cond. layers reactive to Li, and second layers unreactive to the first layers and preformed on surfaces of Li metal anodes. Preferably, the first layers comprise cryst. and/or amorphous Li ion conductive sulfides, and the second layers comprise Li ion conductive thin films chosen from Li₃N, LiI, LiF, SOCl₂-Li reaction product, Li sulfite, and LiPF₆.

IT 7439-93-2DP, Lithium, reaction product with thionyl chloride
(second solid electrolyte layer; solid secondary lithium
batteries using solid electrolytes comprising first low-
ionic-cond. layers reactive to Li and second
layers unreactive to the first layers)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IC ICM H01M010-36
ICS H01M004-02; H01M004-40; H01M004-62
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT Sulfide glasses
(lithium silicon phosphate sulfide, first solid electrolyte
layers; solid secondary lithium batteries using solid
electrolytes comprising first low-ionic-cond.
layers reactive to Li and second layers unreactive to the first
layers)
IT Secondary batteries
(lithium; solid secondary lithium batteries using solid

- electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)
- IT Battery electrolytes
Solid electrolytes
(solid secondary lithium batteries using solid electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)
- IT 361393-39-7
(cryst., first solid electrolyte layer; solid secondary lithium batteries using solid electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)
- IT 13759-10-9, Silicon sulfide (SiS₂)
(glass with Li₂S and Li₃PO₄, first solid electrolyte layer; solid secondary lithium batteries using solid electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)
- IT 10377-52-3, Lithium phosphate
(glass with Li₂S and SiS₂, first solid electrolyte layer; solid secondary lithium batteries using solid electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)
- IT 12136-58-2, Lithium sulfide
(glass with SiS₂ and Li₃PO₄, first solid electrolyte layer; solid secondary lithium batteries using solid electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)
- IT 7439-93-2DP, Lithium, reaction product with thionyl chloride
7719-09-7DP, Thionyl chloride, reaction product with lithium
7789-24-4P, Lithium fluoride, uses 10377-51-2P, Lithium iodide
13308-35-5P 26134-62-3P, Lithium nitride
(second solid electrolyte layer; solid secondary lithium batteries using solid electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)
- IT 21324-40-3P, Lithium hexafluorophosphate
(solid secondary lithium batteries using solid electrolytes comprising first low-ionic-cond. layers reactive to Li and second layers unreactive to the first layers)

L118 ANSWER 2 OF 6 HCA COPYRIGHT 2007 ACS on STN

AN 140:397634 HCA [Full-text](#)

TI Conducting solids

AU Gover, R. K. B.; Slater, P. R.

CS School of Chemistry, University of Durham, Durham, DH1 3LE, UK

SO Annual Reports on the Progress of Chemistry, Section A: Inorganic Chemistry (2003), 99, 477-504

CODEN: APCCDO; ISSN: 0260-1818

PB Royal Society of Chemistry

DT Journal; General Review

LA English

AB A review. Fujiwara et al. have developed a novel method for prepg. cryst. LiCoO₂ cathode films on paper using an electrodeposition method from solns. of LiOH and CoSO₄ at 120°C. This year has also seen a move toward hybrid lithium anode materials by a no. of different research groups, with interesting electrochem. properties being reported for a wide range of materials. In terms of solid oxide fuel cell (SOFC) research, fluorite-type electrolytes (such as yttria stabilized

zirconia) have long dominated the area. Alternative electrolyte materials are however rapidly growing in stature, and represent key highlights of the research in 2002. In particular, promising results from single cell SOFCs based on doped LaGaO₃ have been reported by Ishihara et al. Promising oxide ion cond. has also been reported in apatite-type oxides by a no. of groups. In terms of supercond. research, lithium has been shown to be superconducting under high pressure, with T_c as high as 20 K, which represents the highest T_c for any element.

IT 7439-93-2D, Lithium, derivs.
(conducting solids)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

CC 76-0 (Electric Phenomena)
Section cross-reference(s): 52
IT Crystal structure types
(apatite, ionic cond. in apatite-type;
conducting solids)
IT Anodes
Electric conductors
Fuel cell electrolytes
(conducting solids)
IT Ionic conductivity
(in apatite-type oxides; conducting solids)
IT Oxides (inorganic), properties
(ionic cond. in apatite-type; conducting
solids)
IT 7439-93-2D, Lithium, derivs.
(conducting solids)
RE.CNT 169 THERE ARE 169 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L118 ANSWER 3 OF 6 HCA COPYRIGHT 2007 ACS on STN

AN 136:38098 HCA Full-text

TI Conductive polymeric compositions for lithium batteries

IN Angell, Charles A.; Xu, Wu

PA Arizona State University, Board of Regents, USA

SO PCT Int. Appl., 53 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 3

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	
PI WO 2001096446	A1	20011220	WO 2001-US41009	
			200106	
			16	

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W: CA, JP, KR, US

RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,

NL, PT, SE, TR

CA 2412818	A1	20011220	CA 2001-2412818	
			200106	

16

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EP 1292633 A1 20030319 EP 2001-944709
200106
16

<--

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, FI, CY, TR
JP 2004511879 T 20040415 JP 2002-510578
200106
16

<--

US 2004054126 A1 20040318 US 2003-311643
200309
03

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PRAI US 2000-212231P P 20000616 <--
US 2001-290864P P 20010514 <--
WO 2001-US41009 W 20010616 <--

AB The polymers comprise weakly basic anionic moieties in a polyether backbone at controllable anionic sepn., preferably orthoborate anions capped with dibasic acid residues, preferably oxalato or malonato acid residues and lithium cations. The cond. of the polymers is high relative to that of most conventional salt-in-polymer electrolytes. The cond. at high temp. and wide electrochem. window make these materials esp. suitable as solid polymer electrolytes for rechargeable lithium batteries. A Lewis base contg. polymer electrolyte was prepd. by reaction of oxalato-capped orthoboric acid [formed from LiOH, oxalic acid dihydrate and boric acid] with poly(ethylene glycol), producing a rubbery or cryst. material.

IT 7439-93-2, Lithium, uses
(anode; lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IT 7439-93-2DP, Lithium, oxalato-capped orthoboric acid-PEG complexes
(lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IC ICM C08G079-08

ICS H01M010-44; H01M002-38

CC 35-8 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 36, 52, 76

ST lithium orthoborate polyoxyalkylene electrolyte prepn Lewis acidity;
ionic conductive borate polyether compn

electrolyte lithium battery
IT Battery electrolytes
 Ionic conductivity
 Lewis acidity
 Polymer electrolytes
 (lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)
IT 7439-93-2, Lithium, uses
 (anode; lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)
IT 141-82-2DP, Malonic acid, polymers with ethylene glycol and reaction products with oxalato-borate, lithium complexes 3768-58-9DP, Bis(dimethylamino)-dimethylsilane, polymers with ethylene glycol and reaction products with oxalato-borate, lithium complexes 7439-93-2DP, Lithium, oxalato-capped orthoboric acid-PEG complexes 9016-00-6DP, Dimethyl siloxane, polymers with ethylene glycol and reaction products with oxalato-borate, lithium complexes 10043-35-3DP, Orthoboric acid, oxalato-capped, reaction products with PEG, lithium complexes, preparation 25322-68-3DP, Poly(ethylene glycol), reaction products with oxalato-capped orthoboric acid and with dimethylsiloxane, lithium complexes (lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L118 ANSWER 4 OF 6 HCA COPYRIGHT 2007 ACS on STN
AN 114:110581 HCA [Full-text](#)

TI Lithium insertion and ion exchange reactions in the ionic conducting thallium-metal titanate ($\text{Ti}_2(\text{M},\text{Ti})_8\text{O}_{16}$) phases with hollandite-type structure

AU Wang, E.; Tarascon, J. M.; Colson, S.; Tsai, M.

CS Bellcore, Red Bank, NJ, 07701, USA

SO Journal of the Electrochemical Society (1991), 138(1), 166-72

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

AB Ion exchange reactions and Li insertion in the $\text{Ti}_2(\text{MxTi}_{8-x})\text{O}_{16}$ (M is transition metal and $x = 1,2$) hollandite-type structure compds. have been investigated. Several new phases were synthesized at 450° by an ion exchange reaction using alkali halide salts. A correlation between the ionicity of the M-O bonds and cond. was confirmed, but no samples exhibited an ionic cond. exceeding $10^{-4} \Omega^{-1} \text{ cm}^{-1}$ at 200° . For the first time it was shown that Li can be chem. or electrochem. intercalated into hollandite-type phases as $\text{Li}_x\text{Ti}_2\text{MTi}_7\text{O}_y$ with x ranging from 0 to 6. Electrochem. and in situ x-ray powder diffraction measurements have shown that Li insertion in these compds. proceeds at voltages lower than 1.2 V and is partially reversible. Upon lithiation, the material undergoes a reversible phase transition. Because of their low Li intercalation voltages, these materials could possibly be used as anodes, instead of Li metal, in secondary Li cells.

IT 7439-93-2, Lithium, reactions
 (insertion of, in thallium-transition metal titanate)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

CC 72-2 (Electrochemistry)

Section cross-reference(s): 75, 76, 78

IT Crystal structure

(of thallium-transition metal titanate, lithium and sulfur effect on)

IT 132496-13-0, Aluminum potassium titanium oxide

(Al₂K₀-2Ti₆O₁₆) 132496-14-1, Aluminum sodium titanium

oxide (Al₂Na₀-2Ti₆O₁₆) 132496-36-7, Cesium magnesium

titanium oxide (Cs₀-2MgTi₇O₁₆) 132496-37-8, Magnesium

rubidium titanium oxide (MgRb₀-2Ti₇O₁₆) 132519-09-6,

Magnesium potassium titanium oxide (MgK₀-2Ti₇O₁₆)

132519-10-9, Magnesium sodium titanium oxide

(MgNa₀-2Ti₇O₁₆) 132519-11-0, Aluminum cesium titanium

oxide (Al₂Cs₀-2Ti₆O₁₆) 132519-12-1, Aluminum rubidium

titanium oxide (Al₂Rb₀-2Ti₆O₁₆)

(crystal lattice of)

IT 132495-43-3, Iron thallium titanate (Fe₂Tl_{1.5}Ti₆O₁₆) 132495-58-0,

Chromium thallium titanium oxide (Cr₂TlTi₆O₁₆)

132495-59-1, Cobalt thallium titanium oxide (CoTl₂Ti₇O₁₆)

132496-15-2, Manganese thallium titanate (Mn₂Tl_{1.2}Ti₆O₁₆)

132496-16-3, Aluminum thallium titanium oxide

(Al₂Tl_{1.1}Ti₆O₁₆) 132496-17-4, Thallium zinc titanate

(Tl_{1.5}ZrTi₇O₁₆) 132496-18-5, Nickel thallium titanate

(NiTl_{1.7}Ti₇O₁₆) 132496-19-6, Magnesium thallium titanate

(MgTl_{1.8}Ti₇O₁₆)

(crystal structure and electrochem. insertion of lithium in)

IT 7439-93-2, Lithium, reactions

(insertion of, in thallium-transition metal titanate)

L118 ANSWER 5 OF 6 HCA COPYRIGHT 2007 ACS on STN

AN 106:87635 HCA [Full-text](#)

TI Investigation of a vitreous electrolyte for use in lithium/sulfur cells

AU Smith, M. L.; McLarnon, F. R.; Cairns, E. J.

CS Lawrence Berkeley Lab., CA, USA

SO Report (1985), LBL-20737; Order No. DE86011192, 110 pp.

Avail.: NTIS

From: Energy Res. Abstr. 1986, 11(15), Abstr. No. 34106

DT Report

LA English

AB Novel Li/S cells, which employed a fast-Li-ion conducting Li chloroborate glass as the solid electrolyte, were built and operated at 400°. The compn. of the glass used for this study was (LiCl)₂ 7.3 mol% and Li₂O and B₂O₃ 67.0 mol%; and it had an ionic cond. of $2.9 \times 10^{-3} (\Omega\text{-cm})^{-1}$ at 400°, which was somewhat lower than those of other Li chloroborate glasses. The current-voltage characteristics of these cells were capable of supporting pseudo-steady-state current densities of $\leq 15 \text{ mA/cm}^2$ for 15-20 h. A limiting current existed at approx. 23 mA/cm². These cells could be charged and discharged with approx. equal polarization in either direction. However, the accumulation of a cryst. reaction layer on the surface of the electrolyte during discharge caused the cells to fail before the completion of a full charge-discharge cycle. These cells were also used to measure the soly. of Li₂S_x in S. The soly. limit occurred at 0.04 mol% Li at 400°.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 57

ST glass electrolyte lithium sulfur battery

; chloroborate glass battery electrolyte; polysulfide lithium soly sulfur

IT Glass, oxide
 (chloroborate, electrolytes, in lithium-sulfur
 batteries)
 IT Batteries, secondary
 (lithium-sulfur, vitreous electrolyte for)
 IT Electric conductivity and conduction
 (ionic, of lithium chloroborate glass, for
 lithium-sulfur batteries)
 IT 7447-41-8, Lithium chloride (LiCl), properties 12057-24-8, Lithium
 oxide (Li₂O), properties
 (chloroborate glasses contg., ionic cond. of,
 for lithium-sulfur batteries)
 IT 7704-34-9, Sulfur, properties
 (soly. in, of lithium polysulfide, measurement of,
 lithium-sulfur batteries in)
 IT 66559-78-2
 (soly. of, in sulfur, measurement of, lithium
 -sulfur batteries in)

L118 ANSWER 6 OF 6 HCA COPYRIGHT 2007 ACS on STN

AN 95:194349 HCA [Full-text](#)

TI The behavior of the lithium/lithium nitride interface under
 anodic polarization

AU Von Alpen, U.; Bell, M. F.

CS VARTA Batterie A.-G., Kelkheim, D-6233, Fed. Rep. Ger.

SO Solid State Ionics (1981), 3-4, 259-62

CODEN: SSIOD3; ISSN: 0167-2738

DT Journal

LA English

AB The kinetics of Li transport across the interface formed by melting Li onto a Li₃N sinter was studied using a linear potential
 sweep technique. A mode, which allows the calcn. of the product of concn. and diffusion coeff. to be calcd. is proposed to
 account for the obsd. behavior. In this model, it is suggested that the 2nd mobile species, required for electroneutrality, is H
 introduced into the samples during prepn. IR absorption measurements carried out on a Li₃N single crystal during
 polarization between Li electrodes show that both Li ions and H ions are mobile.

IT 7439-93-2, properties
 (anodic polarization of lithium nitride interface with,
 lithium transport in relation to)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 72-7 (Electrochemistry)

Section cross-reference(s): 76

ST anodic polarization lithium nitride interface;
 cond ionic lithium nitride

IT Electrolytic polarization
 (anodic, at lithium-lithium nitride interface, lithium
 transport in relation to)

IT Electric conductivity and conduction
 (ionic, of lithium nitride, hydrogen doping effect on)

IT 26134-62-3

(anodic polarization of lithium at interface with,

lithium transport in relation to)
IT 7439-93-2, properties
(anodic polarization of lithium nitride interface with,
lithium transport in relation to)
IT 1333-74-0, properties
(elec. cond. of lithium nitride crystals
doped with)

=> D L120 1-18 BIB ABS HITSTR HITIND

L120 ANSWER 1 OF 18 HCA COPYRIGHT 2007 ACS on STN
AN 145:127634 HCA Full-text
TI Protected lithium anodes for lithium secondary batteries
IN Cho, Jung Geun; Kim, Min Seok; Lee, Jong Gi; Lee, Sang Mok
PA Samsung SDI Co., Ltd., S. Korea
SO Repub. Korean Kongkae Taeho Kongbo, No pp. given
CODEN: KRXXA7

DT Patent
LA Korean
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI KR 2004026370	A	20040331	KR 2002-57814	20020924

<--
PRAI KR 2002-57814 20020924 <--

AB This Li anode extends the service life of Li secondary batteries by using 2 protection layers sepd. from each other in the anode, and both of these have some distance from the end of the Li anode. The Li anode comprises: a 1st protection layer arranged on the surface of the Li metal, wherein the surface is opposite to the side contacting the current collector; and a 2nd protection layer arranged inside the Li layer. The protection layers have Li-ion cond. and are sepd. from the end of the anode.

IT 7439-93-2, Lithium, uses
(protected lithium anodes for lithium secondary
batteries)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-02
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST protected lithium anode lithium battery
IT Secondary batteries
(lithium; protected lithium anodes for lithium
secondary batteries)
IT Battery anodes
(protected lithium anodes for lithium secondary
batteries)
IT 7439-93-2, Lithium, uses
(protected lithium anodes for lithium secondary

batteries)

L120 ANSWER 2 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 142:41556 HCA Full-text

TI Aliovalent anion protective layers for active
metal anodes

IN De Jonghe, Lutgard; Nimon, Yevgeniy S.; Visco, Steven J.

PA Polyplus Battery Company, USA

SO PCT Int. Appl., 37 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2004109823	A1	20041216	WO 2004-US17646	20040604

<--

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

US 2004253510	A1	20041216	US 2004-861336	20040603
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EP 1629552	A1	20060301	EP 2004-776270	20040604
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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK

PRAI US 2003-476143P P 20030604 <--

US 2003-482997P P 20030627 <--

US 2004-861336 A 20040603

WO 2004-US17646 W 20040604

AB Active metal anodes can be protected from deleterious reaction and voltage delay in an active metal anode-solid cathode battery cell, and damage to the anode can be significantly reduced or completely alleviated by coating the active metal anode (e.g., Li) surface with a thin layer of a chem. protective layer incorporating aliovalent (multivalent) anions on the lithium metal surface. Such an aliovalent surface layer is conductive to Li-ions but can protect lithium metal from reacting with oxygen, nitrogen or moisture in ambient atm. thereby allowing the lithium material to be handled outside of a controlled atm., such as a dry room. Particularly, preferred examples of such protective layers include mixts. or solid solns. of lithium phosphate, lithium metaphosphate, and/or lithium sulfate. These protective layers can be formed on the Li surface by treatment with dild. solns. of the following acids: H3PO4, HPO3 and H2SO4 or their acidic salts in a dry org. solvent compatible with Li by various techniques. Such chem. protection of the Li or other active metal electrode

significantly enhances active metal electrode protection and reduces the voltage delay due to protected anode's improved stability toward the electrolyte.

IT 7439-93-2, Lithium, uses
(aliovalent anion protective layers for
active metal anodes)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-04

ICS H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery anode aliovalent anion protective
layer coating

IT Phosphates, uses

Sulfates, uses

(active metal; aliovalent anion protective
layers for active metal anodes)

IT Battery anodes

Coating materials

(aliovalent anion protective layers for
active metal anodes)

IT Alkali metals, uses

Alkaline earth metals

Oxides (inorganic), uses

Sulfides, uses

(aliovalent anion protective layers for
active metal anodes)

IT Alloys, uses

(alk. earth; aliovalent anion protective layers
for active metal anodes)

IT Alloys, uses

(alkali metal; aliovalent anion protective
layers for active metal anodes)

IT Alkali metals, uses

Alkaline earth metals

(alloys; aliovalent anion protective layers
for active metal anodes)

IT Primary batteries

Secondary batteries

(lithium; aliovalent anion protective layers
for active metal anodes)

IT Phosphates, uses

(metaphosphates, active metal; aliovalent anion
protective layers for active metal
anodes)

IT Halides

(oxyhalides, liq.; aliovalent anion protective
layers for active metal anodes)

IT 108-32-7, Propylene carbonate 110-71-4, 1,2-Dimethoxyethane

1313-13-9, Manganese dioxide, uses 1313-27-5, Molybdenum oxide

(MoO₃), uses 1317-37-9, Iron sulfide (FeS) 1317-38-0, Copper

oxide (CuO), uses 1317-40-4, Copper sulfide (CuS)
7439-93-2, Lithium, uses 7439-95-4, Magnesium, uses
7440-09-7, Potassium, uses 7440-23-5, Sodium, uses 7440-39-3,
Barium, uses 7440-41-7, Beryllium, uses 7440-70-2, Calcium, uses
7704-34-9, Sulfur, uses 7719-09-7, Thionyl chloride 7784-01-2,
Silver chromate 7791-03-9, Lithium perchlorate 11105-02-5,
Silver vanadium oxide 12039-13-3, Titanium sulfide (TiS₂)
12068-85-8, Iron sulfide (FeS₂) 14283-07-9, Lithium
tetrafluoroborate 15365-14-7, Iron lithium phosphate felipo4
21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium
hexafluoroarsenate 39300-70-4, Lithium nickel oxide 39457-42-6,
Lithium manganese oxide 52627-24-4, Cobalt lithium oxide
74432-42-1, Lithium polysulfide 90076-65-6, Litfsi

(aliovalent anion protective layers for
active metal anodes)

IT 7664-93-9, Sulfuric acid, uses 13453-86-6, Lithium hydrogen
sulfate

(aliovalent anion protective layers for
active metal anodes)

IT 7664-38-2, Phosphoric acid, uses 10343-62-1, MetaPhosphoric acid
14066-19-4, Hydrogen phosphate, uses 14066-20-7, Dihydrogen
phosphate, uses

(film forming additive; aliovalent anion protective
layers for active metal anodes)

IT 10377-48-7, Lithium sulfate 10377-52-3, Lithium phosphate
(protective layer; aliovalent anion
protective layers for active metal
anodes)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L120 ANSWER 3 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 140:324230 HCA Full-text

TI Lithium metal anode for
lithium battery

IN Cho, Chung-Kun; Lee, Sang-Mock; Lee, Jong-Ki; Kim, Min-Seuk

PA Samsung SDI Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 5 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2004072066	A1	20040415	US 2003-389752	
			200303	
			18	
		<--		
KR 2004035909	A	20040430	KR 2002-62256	
			200210	
			12	
CN 1489229	A	20040414	CN 2003-120528	
			200303	
			13	
		<--		

JP 2004134403 A 20040430 JP 2003-349215
200310
08

<--

JP 3787564 B2 20060621
PRAI KR 2002-62256 A 20021012 <--

AB Provided is a lithium metal anode having a lithium metal layer and a porous polymer film integrated with a surface of the lithium metal layer. The lithium metal anode further includes a current collector attached to the surface of the lithium metal layer opposite the porous polymer film. The lithium metal anode further includes a protective coating layer between the porous polymer film and the lithium metal layer, the protective coating layer having lithium ionic cond. and impermeable to an electrolyte.

IT 7439-93-2, Lithium, uses 7439-93-2D,
Lithium, salt

(lithium metal anode for
lithium battery)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M002-16

ICS H01M002-18; H01M004-40; H01M010-04

INCL 429137000; 429231950; 429246000; 029623200

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

ST lithium metal anode battery

IT Polyoxyalkylenes, uses

Polysiloxanes, uses

(layer; lithium metal anode for
lithium battery)

IT Battery anodes

Coating materials

(lithium metal anode for
lithium battery)

IT Fluoropolymers, uses

(lithium metal anode for
lithium battery)

IT Secondary batteries

(lithium; lithium metal
anode for lithium battery)

IT Ethers, uses

(polycyclic, fluoro-; lithium metal
anode for lithium battery)

IT Energy-rich phosphates

(polymers; lithium metal anode for lithium battery)

IT 7440-02-0, Nickel, uses 7440-50-8, Copper, uses (current collector; lithium metal anode for lithium battery)

IT 9002-88-4, Polyethylene 9003-07-0, Polypropylene (film; lithium metal anode for lithium battery)

IT 25322-68-3, Peo 413569-08-1, 2-Propenoic acid, ion(1-) homopolymer, uses (layer; lithium metal anode for lithium battery)

IT 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane 646-06-0, Dioxolane 7439-93-2, Lithium, uses 7439-93-2D, Lithium, salt 10377-52-3, Lithium phosphate 12627-14-4, Lithium silicate 12676-27-6 26134-62-3, Lithium nitride 33454-82-9, Lithium triflate 37220-89-6, Lithium aluminate 39302-37-9, Lithium titanium oxide 152747-89-2, Lanthanum lithium oxide 184905-46-2, Lithium nitrogen phosphorus oxide 236388-73-1, Lithium silicide sulfide 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum lithium sulfide 236388-76-4, Lithium phosphide sulfide 342379-43-5, Germanium lithium sulfide (lithium metal anode for lithium battery)

IT 9002-84-0, Ptfе 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, Pvdф 25014-41-9, Polyacrylonitrile 25067-11-2, Hexafluoropropylene-tetrafluoroethylene copolymer 59947-24-9, Polychlorofluoroethylene (lithium metal anode for lithium battery)

L120 ANSWER 4 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 137:297449 HCA [Full-text](#)

TI Atmospheric pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries

IN Breikopf, Richard C.; Erbil, Ahmet

PA USA

SO U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2002150823	A1	20021017	US 2001-832386	
			200104	
			11	
		<--		
WO 2002099910	A1	20021212	WO 2002-US11526	
			200204	
			11	
		<--		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,

CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ,
TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE,
CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,
SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,
SN, TD, TG

AU 2002346629 A1 20021216 AU 2002-346629

200204

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PRAI US 2001-832386 A 20010411 <--

WO 2002-US11526 W 20020411 <--

AB Systems and methods are disclosed for providing an atm. pressure chem. vapor deposition grown lithium ion conducting electrolyte component of a thin film battery. The thin film battery generally includes a substrate, a sequentially deposited ensemble of thin film layers including at least one current collector, and an electrolyte sandwiched between a cathode and an anode. The current collecting layer may be positioned on a portion of the substrate to allow good elec. contact with the anode or cathode and an external charging device. A protective coating may be placed over the thin film battery to protect the battery from deterioration when exposed to atm. conditions, elevated temps. and certain manufg. processes. A process involving prepn. of a soln. including volatile lithium, aluminum and phosphorus compds. that is sprayed onto a heated substrate contg. a thin film layer current collector makes the electrolyte thin film layer. The result forms a mixed oxide material for instance, $\text{Li}_2\text{O}-x\text{Al}_2\text{O}_3-y\text{P}_2\text{O}_5$. The mixed oxide material is post-treated in ammonia at atm. pressure and at selected elevated temps., for instance 500° . The result is an ion-conducting electrolyte.

IT 7439-93-2, Lithium, uses

(anodes; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IT 7439-93-2D, Lithium, compd.

(atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-66

ICS H01M006-18

INCL 429245000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Battery electrolytes

Coating materials

(atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)

- IT Vapor deposition process
(chem., atm. pressure; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT Secondary batteries
(lithium; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT Epoxy resins, uses
(protective coatings; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 7440-32-6, Titanium, uses 7440-48-4, Cobalt, uses
(Au-coated, current collector; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 7440-57-5, Gold, uses
(Co coated with, current collector; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 7439-93-2, Lithium, uses 55574-97-5, Tin nitride
128579-03-3, Zinc nitride
(anodes; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 7429-90-5D, Aluminum, compd. 7439-93-2D, Lithium, compd.
7664-41-7, Ammonia, processes 7723-14-0D, Phosphorus, compd.
(atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 12190-79-3, Cobalt lithium oxide colio2
(atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 1314-56-3DP, Phosphorus pentoxide, reaction product of Li2O and Al2O3 1344-28-1DP, Alumina, reaction product of Li2O and P2O5
12057-24-8DP, Lithia, reaction product of Al2O3 and P2O5
(atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 1314-62-1, Vanadium oxide (V2O5), uses 12031-65-1, Lithium nickel oxide linio2 12039-13-3, Titanium sulfide (TiS2) 39457-42-6,
Lithium manganese oxide
(cathodes; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)
- IT 7631-86-9, Silica, uses
(protective coatings; atm. pressure CVD grown lithium ion-conducting electrolyte for thin-film batteries)

L120 ANSWER 5 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 136:137424 HCA [Full-text](#)

TI Fabrication of lithium anodes and batteries

IN Skotheim, Terje A.; Sheehan, Christopher J.; Mikhaylik, Yuriy V.;
Affinito, John

PA USA

SO U.S. Pat. Appl. Publ., 22 pp., Cont.-in-part of U.S. Ser. No.
721,578.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 3

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2002012846	A1	20020131	US 2001-864890	
			200105	
			23	
			<--	
US 7247408	B2	20070724		
US 6733924	B1	20040511	US 2000-721519	
			200011	
			21	
			<--	
US 6797428	B1	20040928	US 2000-721578	
			200011	
			21	
			<--	
CN 1728418	A	20060201	CN 2005-10079023	
			200011	
			21	
			<--	
WO 2002095849	A2	20021128	WO 2002-US16649	
			200205	
			23	
			<--	
WO 2002095849	A3	20031204		
			W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,	
			CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,	
			GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,	
			LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,	
			NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR,	
			TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW	
			RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,	
			BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI,	
			FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG,	
			CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG	
AU 2002312067	A1	20021203	AU 2002-312067	
			200205	
			23	
			<--	
EP 1407505	A2	20040414	EP 2002-739419	
			200205	
			23	
			<--	
EP 1407505	B1	20050803		
			R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,	
			PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR	
CN 1511351	A	20040707	CN 2002-810473	
			200205	
			23	
			<--	
JP 2004527888	T	20040909	JP 2002-592213	
			200205	
			23	
			<--	
US 2005008935	A1	20050113	US 2004-913839	

200408
06

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US 6936381 B2 20050830
US 2006222954 A1 20061005 US 2006-452445
200606
13

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PRAI US 1999-167171P P 19991123 <--
US 2000-721519 A2 20001121 <--
US 2000-721578 A2 20001121 <--
CN 2000-818169 A3 20001121 <--
US 2001-864890 A 20010523 <--
WO 2002-US16649 W 20020523 <--

AB Provided is an anode for use in electrochem. cells, wherein the anode active layer has a first layer comprising lithium metal and a multi-layer structure comprising single ion conducting layers and polymer layers in contact with the first layer comprising lithium metal or in contact with an intermediate protective layer, such as a temporary protective metal layer, on the surface of the lithium-contg. first layer. Another aspect of the invention provides an anode active layer formed by the in-situ deposition of lithium vapor and a reactive gas. The anodes of the current invention are particularly useful in electrochem. cells comprising sulfur-contg. cathode active materials, such as elemental sulfur.

IT 7439-93-2, Lithium, uses
(fabrication of lithium anodes and batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-40

ICS H01M004-66; B05D005-12

INCL 429231950

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery anode lithium; sulfur contg cathode battery
lithium anode

IT Polyesters, uses
(acrylates; fabrication of lithium anodes and batteries)

IT Battery anodes
(fabrication of lithium anodes and batteries)

IT Acrylic polymers, uses
(fabrication of lithium anodes and batteries)

IT Polyoxyalkylenes, uses
(fabrication of lithium anodes and batteries)

IT Hydrocarbons, uses
(fabrication of lithium anodes and batteries)

IT Borate glasses
(lithium borate; fabrication of lithium anodes and batteries)

IT Phosphate glasses
(lithium phosphate; fabrication of lithium anodes and batteries)

IT Sulfide glasses
(lithium phosphosulfide; fabrication of lithium anodes and batteries)

IT Silicate glasses
(lithium silicate; fabrication of lithium anodes and
batteries)

IT Secondary batteries
(lithium; fabrication of lithium anodes and batteries)

IT 7631-86-9, Fumed silica, uses
(colloidal; fabrication of lithium anodes and
batteries)

IT 110-71-4 646-06-0, 1,3-Dioxolane 1344-28-1, Dispal 11N7-12, uses
7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses
12031-63-9, Lithium niobium oxide (LiNbO3) 12769-51-6, Lithium
tantalum oxide 37220-89-6, Lithium aluminate 39302-37-9, Lithium
titanium oxide 90076-65-6, Lithium bis(trifluoromethylsulfonyl)imi
de 152747-89-2, Lanthanum lithium oxide 184905-46-2, Lithium
nitrogen phosphorus oxide 236388-73-1, Lithium silicide sulfide
236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum lithium
sulfide 342379-43-5, Germanium lithium sulfide
(fabrication of lithium anodes and batteries)

IT 9002-89-5, Airvol 125 25322-68-3, Peo 64401-02-1, CD 9038
221629-51-2, CN 984
(fabrication of lithium anodes and batteries)

IT 74-85-1, Ethylene, uses 74-86-2, Acetylene, uses 124-38-9,
Carbon dioxide, uses 7440-50-8, Copper, uses 7446-09-5, Sulfur
dioxide, uses 7727-37-9, Nitrogen, uses
(fabrication of lithium anodes and batteries)

RE.CNT 51 THERE ARE 51 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L120 ANSWER 6 OF 18 HCA COPYRIGHT 2007 ACS on STN
AN 135:7791 HCA Full-text
TI Lithium anodes for electrochemical cells
IN Skotheim, Terje A.; Sheehan, Christopher J.; Mikhaylik, Yuriy V.;
Affinito, John
PA Moltech Corporation, USA
SO PCT Int. Appl., 39 pp.
CODEN: PIXXD2

DT Patent
LA English

FAN.CNT 3

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2001039302	A1	20010531	WO 2000-US32232	200011 21

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W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,
CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,
LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ,
PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ,
UA, UG, US, UZ, VN, YU, ZA, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,
TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD,
TG

AU 200116286 A 20010604 AU 2001-16286
200011
21

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EP 1236231 A1 20020904 EP 2000-978872
200011
21

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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR
JP 2003515892 T 20030507 JP 2001-540869
200011
21

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CN 1728418 A 20060201 CN 2005-10079023
200011
21

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PRAI US 1999-167171P P 19991123 <--
CN 2000-818169 A3 20001121 <--
WO 2000-US32232 W 20001121 <--

AB Provided is an anode for use in electrochem. cells, wherein the anode active layer has a first layer comprising lithium metal and a multi-layer structure comprising single ion conducting layers and crosslinked polymer layers in contact with the first layer comprising lithium metal or in contact with an intermediate protective layer, such as a temporary protective metal layer, or plasma CO₂ treatment layers on the surface of the lithium-contg. first layer. The anodes of the current invention are particularly useful in electrochem. cells comprising sulfur-contg. cathode active materials, such as elemental sulfur.

IT 7439-93-2, Lithium, uses
(lithium anodes for electrochem. cells)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

ST lithium battery anode

IT Battery anodes

(lithium anodes for electrochem. cells)

IT Acrylic polymers, uses

(lithium anodes for electrochem. cells)

IT Glass, uses

(lithium anodes for electrochem. cells)

IT 10377-52-3, Lithium phosphate 11115-95-0, Lithium niobium oxide
12627-14-4, Lithium silicate 12676-27-6 12769-51-6, Lithium
tantalum oxide 37220-89-6, Lithium aluminate 39302-37-9, Lithium
titanium oxide 152747-89-2, Lanthanum lithium oxide 184905-46-2,
Lithium nitrogen phosphorus oxide 236388-73-1, Lithium silicide
sulfide 236388-74-2, Lithium boride sulfide 236388-75-3,
Aluminum lithium sulfide 236388-76-4, Lithium phosphide sulfide
342379-43-5, Germanium lithium sulfide
(glass; lithium anodes for electrochem. cells)

IT 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses
 (lithium anodes for electrochem. cells)
 IT 7429-90-5, Aluminum, uses 7439-95-4, Magnesium, uses 7440-31-5,
 Tin, uses 7440-66-6, Zinc, uses
 (lithium anodes for electrochem. cells)
 RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L120 ANSWER 7 OF 18 HCA COPYRIGHT 2007 ACS on STN
 AN 135:7784 HCA Full-text

TI Methods of preparing a cathode/separator assembly for use in
 electrochemical cells

IN Carlson, Steven A.

PA Moltech Corporation, USA

SO PCT Int. Appl., 100 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 3

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2001039293	A2	20010531	WO 2000-US32231	200011 21

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WO 2001039293 A3 20020117

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,
 CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH,
 GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,
 LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ,
 PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ,
 UA, UG, US, UZ, VN, YU, ZA, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,
 CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,
 TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD,
 TG

AU 2001017965 A5 20010604 AU 2001-17965
 200011
 21

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US 7066971 B1 20060627 US 2002-148156
 200209
 30

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PRAI US 1999-167150P P 19991123 <--
 WO 2000-US32231 W 20001121 <--

AB Provided are methods of prepg. a cathode/separator assembly for use in electrochem. cells in which a protective coating layer, such as a single ion conducting layer, is coated on a temporary carrier substrate, a microporous separator layer is then coated on the protective coating layer, and a cathode active layer is then coated on the separator layer, prior to removing the temporary carrier substrate from the protective coating layer. Addnl. layers, including an edge insulating layer, a cathode current collector layer, an electrode insulating layer, an anode current collector layer, an anode layer such as a lithium metal layer, and an anode protective layer, such as a single ion conducting layer, may be applied subsequent to the coating step of the microporous separator layer. Also, provided are methods of prepg. electrochem. cells utilizing cathode/separator assemblies prepd. by such methods, and cathode/separator assemblies and electrochem. cells prepd. by such methods.

IT 7439-93-2, Lithium, uses
(methods of prepg. cathode/separator assembly for use in
electrochem. cells)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IC ICM H01M002-00
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

IT Battery anodes
Battery cathodes
Battery electrolytes
Polymer electrolytes
Primary batteries
Secondary battery separators
Xerogels
(methods of prepg. cathode/separator assembly for use in
electrochem. cells)

IT 110-71-4 646-06-0, 1,3-Dioxolane 7439-93-2, Lithium,
uses 7440-44-0D, Carbon, lithium intercalated, uses 7704-34-9,
Sulfur, uses 12798-95-7 14283-07-9, Lithium tetrafluoroborate
39448-96-9, Graphite lithium 53680-59-4 115672-18-9, Lithium
sulfide (Li₂(S₈))
(methods of prepg. cathode/separator assembly for use in
electrochem. cells)

L120 ANSWER 8 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 133:32696 HCA Full-text

TI Protective coating for battery separators with
microporous pseudo-boehmite layer

IN Ying, Qicong; Carlson, Steven A.; Skotheim, Terje A.

PA Moltech Corporation, USA

SO PCT Int. Appl., 76 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 4

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	WO 2000036671	A1	20000622	WO 1999-US30214
				199912
				16

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W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU,
CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID,
IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU,
LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD,
SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN,
YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,

DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF,
BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 6194098 B1 20010227 US 1998-215029
199812
17

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US 6183901 B1 20010206 US 1999-399967
199909
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US 6277514 B1 20010821 US 1999-447901
199911
23

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EP 1151486 A1 20011107 EP 1999-966420
199912
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EP 1151486 B1 20030521
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO
JP 2002532852 T 20021002 JP 2000-588826
199912
16

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PRAI US 1998-215029 A2 19981217 <--
US 1999-399967 A2 19990921 <--
US 1999-447901 A2 19991123 <--
WO 1999-US30214 W 19991216 <--

AB This invention pertains to separators for use in electrochem. cells which comprise at least one microporous pseudo-boehmite layer, which separator is in contact with at least one **protective coating layer** positioned on the **anode** -facing side of the separator opposite from the cathode active layer in the cell; electrolyte elements comprising such separators; elec. current producing cells comprising such separators; and methods of making such separators, electrolyte elements and cells.

IT 7439-93-2, Lithium, uses
(**protective coating** for battery separators
with microporous pseudo-boehmite layer)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M002-16

ICS H01M010-40; B01D071-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 57

ST battery separator microporous pseudoboehmite layer polymer
protective coating

IT Polyesters, uses
(acrylates; **protective coating** for battery
separators with microporous pseudo-boehmite layer)

IT Sulfide glasses
(germanium lithium sulfide; **protective coating**
for battery separators with microporous pseudo-boehmite layer)

- IT Styrene-butadiene rubber, uses
(hydrogenated, block, triblock; **protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT Sulfide glasses
(lithium phosphorus sulfide; **protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT Polyurethanes, uses
(polyoxyalkylene-, acrylic; **protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT Battery anodes
Coating process
Conducting polymers
Electric conductors, glass
Secondary batteries
Secondary battery separators
(**protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT ABS rubber
Nitrile rubber, uses
Polyacenes
Polyacetylenes, uses
Polyolefins
Polyurethanes, uses
Styrene-butadiene rubber, uses
(**protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT 9003-56-9
(abs rubber, **protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT 10377-52-3, Lithium phosphate 12627-14-4, Lithium silicate 12676-27-6 37220-89-6, Lithium aluminate 39302-37-9, Lithium titanium oxide 152747-89-2, Lanthanum lithium oxide 184905-46-2, Lithium nitrogen phosphorus oxide 236388-73-1, Lithium silicide sulfide 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum lithium sulfide
(ion-conducting glass; **protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT 9003-18-3
(nitrile rubber, **protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT 7631-86-9, Silica, uses
(pigment; **protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT 110-71-4 646-06-0, 1,3-Dioxolane 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses 63957-70-0, Pseudoboehmite 90076-65-6
(**protective coating** for battery separators with microporous pseudo-boehmite layer)
- IT 9003-19-4, Polyvinyl ether 9003-39-8, Polyvinyl pyrrolidone 9003-63-8, Polybutyl methacrylate 25067-58-7, Polyacetylene 25190-62-9, Poly(p-phenylene) 28774-98-3, Poly(naphthalene-2,6-diyl) 64401-02-1D, polymer with urethane acrylate 82451-56-7, Polyazulene 96638-49-2, Poly(phenylenevinylene) 114239-80-4, Poly(perinaphthalene)

(protective coating for battery separators
with microporous pseudo-boehmite layer)

IT 106107-54-4 694491-73-1
(styrene-butadiene rubber, hydrogenated, block, triblock;
protective coating for battery separators with
microporous pseudo-boehmite layer)

IT 9003-55-8
(styrene-butadiene rubber, protective coating
for battery separators with microporous pseudo-boehmite layer)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L120 ANSWER 9 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 132:125362 HCA Full-text

TI Protective coatings for battery anodes

IN Visco, Steven J.; Chu, May-Ying

PA Polyplus Battery Company, Inc., USA

SO U.S., 18 pp., Cont.-in-part of U.S. 5,789,108.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 15

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 6025094	A	20000215	US 1998-86665	19980529
		<--		
US 5523179	A	19960604	US 1994-344384	19941123
		<--		
US 5582623	A	19961210	US 1995-479687	19950607
		<--		
US 5686201	A	19971111	US 1996-686609	19960726
		<--		
US 5789108	A	19980804	US 1997-814927	19970311
		<--		
US 2001041294	A1	20011115	US 2001-901970	20010709
		<--		
US 6723140	B2	20040420		
PRAI US 1994-344384	A2	19941123	<--	
US 1995-479687	A2	19950607	<--	
US 1996-686609	A2	19960726	<--	
US 1997-814927	A2	19970311	<--	
US 1998-86665	A	19980529	<--	
US 1998-139601	A	19980825	<--	

US 1998-139603 A1 19980825 <--

AB Disclosed is an alkali metal neg. electrode having a protective layer. Specifically, the disclosed neg. electrode includes a glassy or amorphous surface protective layer which conducts alkali metal ions but effectively blocks the alkali metal in the electrode from direct contact with the ambient. The protective layer has improved smoothness and reduced internal stress in comparison to prior protective layers such as those formed by sputtering. In a specific embodiment, the protective layer is formed on the lithium metal electrode surface by a plasma assisted deposition technique.

IT 7439-93-2, Lithium, uses
(protective coatings for battery
anodes)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-58

INCL 429231950

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery anode protective coating

IT Coating process
(plasma spraying; protective coatings for
battery anodes)

IT Battery anodes
Coating materials
Secondary batteries
(protective coatings for battery
anodes)

IT Lithium alloy, base
Sodium alloy, base
(protective coatings for battery
anodes)

IT 3277-26-7, 1,1,3,3-Tetramethyldisiloxane 7440-21-3D, Silicon, org.
compds., reactions 7440-42-8, Boron, reactions 7723-14-0,
Phosphorus, reactions
(precursor; protective coatings for battery
anodes)

IT 7439-93-2, Lithium, uses 7440-23-5, Sodium, uses
12798-95-7 256448-58-5, CZ50
(protective coatings for battery
anodes)

IT 554-13-2, Lithium carbonate 1303-86-2, Boron oxide b2o3, uses
1314-80-3, Phosphorus pentasulfide 7631-86-9, Silica, uses
10377-51-2, Lithium iodide 10377-52-3, Lithium phosphate li3po4
12057-24-8, Lithia, uses 12627-14-4, Lithium silicate 12676-27-6
26134-62-3, Lithium nitride 37220-89-6, Lithium aluminate
184905-46-2, Lithium nitrogen phosphorus oxide 236388-73-1,
Lithium silicide sulfide 236388-74-2, Lithium boride sulfide
236388-75-3, Aluminum lithium sulfide 236388-76-4, Lithium
phosphide sulfide
(protective coatings for battery
anodes)

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L120 ANSWER 10 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 131:146969 HCA Full-text

TI Plating metal anodes under protective
coatings for use in batteries

IN Chu, May-Ming; Visco, Steven J.; De Jonghe, Lutgard C.

PA Polyplus Battery Company, Inc., USA

SO PCT Int. Appl., 40 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 15

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI WO 9943034	A1	19990826	WO 1999-US3335	
			199902	
			17	

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W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ,
DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN,
IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD,
MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI,
SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW

RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK,
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF,
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 6402795	B1	20020611	US 1998-139603	
			199808	
			25	

<--

CA 2322131	A1	19990826	CA 1999-2322131	
			199902	
			17	

<--

AU 9932959	A	19990906	AU 1999-32959	
			199902	
			17	

<--

AU 743685	B2	20020131		
BR 9908010	A	20001024	BR 1999-8010	
			199902	
			17	

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EP 1057222	A1	20001206	EP 1999-934368	
			199902	
			17	

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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, LV, FI

JP 2002504741	T	20020212	JP 2000-532875	
			199902	
			17	

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MX 2000PA08067	A	20010328	MX 2000-PA8067	
			200008	
			18	

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PRAI US 1998-75017P P 19980218 <--
US 1998-139603 A 19980825 <--
WO 1999-US3335 W 19990217 <--

AB A method for forming lithium electrodes having protective layers involves plating lithium between a lithium ion conductive protective layer and a current collector of an electrode precursor. The electrode precursor is formed by depositing the protective layer on a very smooth surface of a current collector. The protective layer is a glass such as lithium phosphorus oxynitride and the current collector is a conductive sheet such as a copper sheet. During plating, lithium ions move through the protective layer and a lithium metal layer plates onto the surface of the current collector. The resulting structure is a protected lithium electrode. To facilitate uniform lithium plating, the electrode precursor may include a wetting layer which coats the current collector.

IT 7439-93-2, Lithium, uses
(plating metal anodes under
protective coatings for use in batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-04

ICS H01M004-12; H01M010-36; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery lithium anode plating; coating lithium phosphorus
oxynitride battery anode

IT Primary batteries

Secondary batteries

(lithium; plating metal anodes
under protective coatings for use in
batteries)

IT Plastics, uses

(metalized, current collector; plating metal anodes
under protective coatings for use in
batteries)

IT Battery anodes

(plating metal anodes under protective
coatings for use in batteries)

IT Glass, uses

(plating metal anodes under protective
coatings for use in batteries)

IT 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses 7439-95-4,
Magnesium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses
7440-31-5, Tin, uses 7440-44-0, Carbon, uses 11126-12-8, Iron
sulfide 12673-92-6, Titanium sulfide

(anode precursor, wetting layer material; plating metal
anodes under protective coatings for
use in batteries)

IT 7440-02-0, Nickel, uses 7440-50-8, Copper, uses 7440-66-6, Zinc,
uses 12597-68-1, Stainless steel, uses

(current collector; plating metal anodes under
protective coatings for use in batteries)

IT 1313-99-1, Nickel oxide (NiO), uses 7446-09-5, Sulfur dioxide,
uses 7553-56-2, Iodine, uses 7704-34-9, Sulfur, uses

7719-09-7, Thionyl chloride 11099-11-9, Vanadium oxide

11104-61-3, Cobalt oxide 11129-60-5, Manganese oxide 12068-85-8,
 Iron sulfide FeS_2 12162-79-7, Lithium manganese oxide LiMnO_2
 25233-30-1, Polyaniline 51311-17-2, Carbon fluoride
 (plating metal anodes under protective
 coatings for use in batteries)
 IT 7439-93-2, Lithium, uses
 (plating metal anodes under
 protective coatings for use in batteries)
 IT 74432-42-1, Lithium polysulfide 236388-74-2, Lithium
 boride sulfide 236388-76-4, Lithium phosphide sulfide
 (plating metal anodes under
 protective coatings for use in batteries)
 IT 10377-52-3, Lithium phosphate 12627-14-4, Lithium silicate
 12676-27-6 37220-89-6, Lithium aluminate 184905-46-2, Lithium
 nitrogen phosphorus oxide 236388-73-1, Lithium silicide sulfide
 236388-75-3, Aluminum lithium sulfide
 (protective layer; plating metal
 anodes under protective coatings for
 use in batteries)
 RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L120 ANSWER 11 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 127:320872 HCA [Full-text](#)

TI The effect of passivating films involving the lithium anode
 in thionyl chloride, bromine trifluoride, molten nitrates, and
 molten perchlorates

AU Miles, Melvin

CS Chemistry Materials Branch, Research Technology Group, Naval Air
 Warfare Center Weapons Division, China Lake, CA, 93555-6100, USA

SO Proceedings of the Intersociety Energy Conversion Engineering
 Conference (1997), 32nd, 64-67

CODEN: PIECDE; ISSN: 0146-955X

PB Society of Automotive Engineers

DT Journal

LA English

AB The use of lithium metal anodes in oxidizing solvents requires the formation of a stable passivating film at the anode surface. This film acts as a solid electrolyte interface that transfers ions between the lithium metal and the oxidizing solvent while protecting the lithium from direct chem. attack by the solvent. These protective films generally det. the stability of the lithium anode in the oxidizing solvent as well as the discharge rates and cell voltages that can be attained. For battery applications, the ideal film would be an excellent ion conductor with all of the charge being transported by the metal ion. The passivating film for lithium anodes consists mainly of LiCl in SOCl_2 , LiF or LiBrF_4 in BrF_3 , and Li_2O in molten nitrates and molten perchlorates. The theor. cell potential and energy d. for Li/BrF_3 are 5.26 V at 25° and 2680 $\text{W}\cdot\text{hr}/\text{kg}$ compared with 3.64 V and 1470 $\text{W}\cdot\text{hr}/\text{kg}$ for Li/SOCl_2 . Exptl., the open-circuit potential is measured as 5.12 V for Li/BrF_3 . The discharge of the lithium anode in BrF_3 appears to be limited by the passivating film that forms at the anode. Nevertheless, nearly flat discharge curves are obtained for lithium in BrF_3 at current densities of 20 mA/cm^2 or less. Cell voltages greater than 3 V can be obtained for lithium anodes in molten nitrates. The discharge characteristics of the lithium anode in molten nitrates improve markedly at temps. above the m.p. of lithium ($\text{mp} = 181^\circ$). Discharge rates as large as 1000 mA/cm^2 have been attained for liq. lithium anodes in molten nitrates. The liq. Li anodes can be immobilized in molten nitrates by a lithium-boron matrix or by the use of iron powder. The Li(B) anode is quite stable in the LiNO_3 - KNO_3 eutectic melt at temps. up to 300° and yields discharge current efficiencies exceeding 90%. This stability is lost in initially Li^+ -free nitrate melts such as NaNO_3 - KNO_3 where rapid deterioration of the anode is obsd. These exptl. results can be explained by a thin passivating Li_2O film on the anode that is destabilized in nitrate melts having low lithium-ion concns. There is generally a striking difference in behavior between the lithium anode and the calcium or magnesium anode in oxidizing solvents.

IT 7439-93-2, Lithium, uses

(effect of passivating films involving the lithium anode
in thionyl chloride, bromine trifluoride, molten nitrates, and
molten perchlorates)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery lithium anode passivating film

IT Battery anodes

Battery electrolytes

(effect of passivating films involving the lithium anode
in thionyl chloride, bromine trifluoride, molten nitrates, and
molten perchlorates)

IT Passivation

(electrochem.; effect of passivating films involving the lithium
anode in thionyl chloride, bromine trifluoride, molten
nitrates, and molten perchlorates)

IT Secondary batteries

(lithium; effect of passivating films involving the lithium
anode in thionyl chloride, bromine trifluoride, molten
nitrates, and molten perchlorates)

IT 7439-93-2, Lithium, uses

(effect of passivating films involving the lithium anode
in thionyl chloride, bromine trifluoride, molten nitrates, and
molten perchlorates)

IT 7719-09-7, Thionyl chloride 7787-71-5, Bromine trifluoride

7791-03-9, Lithium perchlorate

(effect of passivating films involving the lithium anode
in thionyl chloride, bromine trifluoride, molten nitrates, and
molten perchlorates)

IT 7790-69-4, Lithium nitrate

(eutectic, with KNO_3 ; effect of passivating films involving the
lithium anode in thionyl chloride, bromine trifluoride,
molten nitrates, and molten perchlorates)

IT 7757-79-1, Potassium nitrate, uses

(eutectic, with LiNO_3 ; effect of passivating films involving the
lithium anode in thionyl chloride, bromine trifluoride,
molten nitrates, and molten perchlorates)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L120 ANSWER 12 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 121:61539 HCA Full-text

TI Protective lithium ion conducting ceramic
coating for lithium metal anodes

IN Bates, John B.

PA Martin Marietta Energy Systems, Inc., USA

SO U.S., 4 pp.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 5314765	A	19940524	US 1993-137285	
			199310	
			14	

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PRAI US 1993-137285 19931014 <--

AB In a battery including a cathode, a lithium anode and an electrolyte between the anode and cathode, a thin-film of lithium phosphorus oxynitride is used to coat the anode and sep. it from the electrolyte. A preliminary layer of lithium nitride may be coated on the anode before the lithium phosphorous oxynitride is coated on the anode so that sepn. of the anode and electrolyte is further enhanced. By coating the lithium anode with this material lay-up, the life of the battery is lengthened and the performance of the battery is enhanced.

IT 7439-93-2, Lithium, uses
(anode, coating of, with lithium phosphorus oxynitride)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M010-40

INCL 429194000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium coating lithium anode battery

IT Anodes

(battery, lithium, protective coating of
lithium phosphorus oxynitride for)

IT 7439-93-2, Lithium, uses

(anode, coating of, with lithium phosphorus oxynitride)

IT 26134-62-3, Lithium nitride 150272-61-0

(lithium anode coating with)

L120 ANSWER 13 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 119:99842 HCA Full-text

TI Active mine batteries with long shelf-life. 1. Development of
lithium-ion conducting polymeric anode
films

AU Abraham, K. M.; Pasquariello, D. M.; Hart, M.; Kilroy, W. P.

CS EIC Labs. Inc., Norwood, MA, USA

SO Report (1991), NAVSWC-TR-91-20; Order No. AD-A245052, 58
pp. Avail.: NTIS

From: Gov. Rep. Announce. Index (U. S.) 1992, 92(9), Abstr. No.
222,879

DT Report

LA English

AB Despite the attractive features of Li/SOCI₂ batteries, e.g., high energy d., high load voltage, and wide operational temp. range, some important problems persist hindering the widespread application of the batteries. Notable among these problems is voltage delay, i.e., the initial drop of the cell voltage to <2 V, on load after prolonged storage, esp. at 70° followed by discharge at high rates and low temps. The delay is due to the Li anode instantaneously forming a protective film of LiCl on the surface when the anode comes in contact with the SOCI₂/LiAlCl₄ electrolyte. Although the reaction of Li and SOCI₂ is strongly favored by thermodyn., the formation of the LiCl film passivates the Li, kinetically hindering the reaction. Prolonged storage of the batteries leads to an increase in the thickness of the LiCl film.

IT 7439-93-2, Lithium, uses
(anodes, passivation of, in active mine thionyl
chloride batteries, storage effect on)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium anode passivation voltage delay; thionyl chloride
lithium battery performance storage
IT Passivation
(electrochem., of lithium anodes, in active mine
thionyl chloride batteries, storage effect on)
IT 7439-93-2, Lithium, uses
(anodes, passivation of, in active mine thionyl
chloride batteries, storage effect on)
IT 7447-41-8P, Lithium chloride, preparation
(film, formation of, on lithium anodes, in active mine
thionyl chloride batteries, storage effect on)

L120 ANSWER 14 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 116:259053 HCA Full-text

TI Secondary batteries with coated anodes

IN Nakane, Ikuro; Fujita, Yasuhiro; Furukawa, Sanehiro

PA Sanyo Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 04028172	A	19920130	JP 1990-131673	19900522

<--

JP 3030053 B2 20000410
PRAI JP 1990-131673 19900522 <--

AB The batteries use MnO₂, MoO₃, V₂O₅, or TiS₂ cathodes and alkali metal (e.g., Li), alk. earth metal, or Al anodes, which are coated with a 1st protective layer and an elastomer-, conducting polymer-, or ion-conductive polymer-based layer. The 1st layer may be salts, oxides, or hydroxides of alkali or alk. earth metals or compds. of P, As, Sb, and/or Bi, the elastomer may be ethylene-propylene or ethylene-propylene-nonconjugated diene copolymers, the conducting polymer may be poly(p-phenylene), polyacetylene, polyaniline, polypyrrole, etc., and the ion-conductive polymer may be PEO or other polymers contg. dispersed Li salts. These batteries have long cycle life.

IT 7439-93-2, Lithium, uses
(anodes, coated, for secondary batteries, for long
cycle life)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

- IC ICM H01M010-40
ICS H01M004-02
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST polymer coating lithium battery anode; phosphorus
pentachloride coating lithium anode; magnesia coating
lithium anode
IT Rubber, synthetic
(EPDM, anodes with coatings contg., lithium, for
secondary batteries)
IT Anodes
(battery, lithium, coated, for long cycle life)
IT 7791-03-9, Lithium perchlorate
(PEO contg. dispersed, anodes with coatings contg.,
lithium, for secondary batteries)
IT 513-77-9, Barium carbonate 1309-48-4, Magnesia, uses 1310-65-2,
Lithium hydroxide 9003-39-8, Polyvinylpyrrolidone 9010-79-1,
Ethylene-propylene copolymer 10026-13-8, Phosphorus pentachloride
14283-07-9, Lithium fluoroborate 24937-79-9, Poly(vinylidene
fluoride) 25014-41-9, Polyacrylonitrile 25067-54-3, Polyfuran
25067-58-7, Polyacetylene 25190-62-9, Poly(p-phenylene)
25212-74-2, Poly(p-phenylenesulfide) 25233-30-1, Polyaniline
25233-34-5, Polythiophene 25322-69-4, Poly(propylene oxide)
26009-24-5, Poly(p-phenylenevinylene) 26499-97-8,
Poly(1,3-phenylene) 26915-72-0 29935-35-1, Lithium
hexafluoroarsenate 30604-81-0, Polypyrrole 31691-80-2,
Poly(thio[1,1'-biphenyl]-4,4'-diyl) 32027-35-3,
Poly(m-phenylenesulfide) 33454-82-9, Lithium
trifluoromethanesulfonate 51555-21-6, Polycarbazole 75788-67-9,
Polyphenothiazine 102250-99-7 114503-66-1
(anodes with coatings contg., lithium, for secondary
batteries)
IT 7439-93-2, Lithium, uses
(anodes, coated, for secondary batteries, for long
cycle life)
IT 25322-68-3, PEO
(lithium perchlorate-dispersed, anodes with coatings
contg., lithium, for secondary batteries)
IT 74-85-1
(rubber, EPDM, anodes with coatings contg., lithium,
for secondary batteries)

L120 ANSWER 15 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 103:107711 HCA [Full-text](#)

TI Protected electrode material and its use in electrical devices

IN Cook, John Anthony; Park, George Barry; McLoughlin, Robert Hamilton

PA Raychem Ltd., UK

SO Eur. Pat. Appl., 19 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI EP 146245	A1	19850626	EP 1984-307533	
			198411	
			01	
	<--			
EP 146245	B1	19900411		
R: AT, BE, CH, DE, FR, GB, IT, LI, NL, SE				
US 4594299	A	19860610	US 1984-667035	
			198411	
			01	
	<--			
CA 1244874	A1	19881115	CA 1984-466814	
			198411	
			01	
	<--			
AT 51980	T	19900415	AT 1984-307533	
			198411	
			01	
	<--			
JP 60115157	A	19850621	JP 1984-232282	
			198411	
			02	
	<--			
PRAI GB 1983-29212	A	19831102	<--	
US 1984-618110	A2	19840607	<--	
EP 1984-307533	A	19841101	<--	

AB Electrode material, preferably Li, is protected by a layer of material ready to function as an electrode separator and capable of sufficient ionic cond. to provide an electrolyte, preferably a solvent-free polymeric electrolyte. The electrode material can be rolled to reduce its thickness while so protected. Thus, 10 g poly(ethylene oxide) was dissolved in predistd. MeCN to prep. a 3% soln., and LiCF₃SO₃ (vacuum-dried 4 h at 130°) was added to give a polymer O:Li ratio of 10:1; the mixt. was stirred 4 h at .apprx.20°. The soln. was poured into a flat glass Petri dish and evapd. slowly to form a 0.3 mm-thick polymer film which was vacuum-dried 8 h at 105°. Polymer films were placed on either sides of a Li foil (width 35, thickness 0.25 mm), and the laminate was drawn between nip rollers to decrease the thickness of the polymer film and Li foil to 0.12 and 0.10 mm, resp. Battery prodn. equipment is also schematically illustrated.

IT 7439-93-2, uses and miscellaneous
(anodes, battery, bonded with lithium
trifluoromethanesulfonate-poly(ethylene oxide) electrolyte,
rolling of)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IT 7439-93-2D, poly(ethylene oxide) complexes
(battery electrolyte, bonded to lithium anode, rolling
of)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM H01M004-02
ICS H01M006-14; H01M006-10; H01M006-18
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST lithium anode electrolyte battery; polyethylene oxide
lithium trifluoromethanesulfonate electrolyte
IT 7439-93-2, uses and miscellaneous
(anodes, battery, bonded with lithium
trifluoromethanesulfonate-poly(ethylene oxide) electrolyte,
rolling of)
IT 7439-93-2D, poly(ethylene oxide) complexes 25322-68-3D,
lithium complexes
(battery electrolyte, bonded to lithium anode, rolling
of)

L120 ANSWER 16 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 101:62600 HCA [Full-text](#)

TI Anode for lithium battery

PA Nippon Telegraph and Telephone Public Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 3 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 59031573	A	19840220	JP 1982-140980	
			198208	
			16	

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PRAI JP 1982-140980 19820816 <--

AB The charge-discharge performance of a Li anode is improved by forming a protective film having Li+- ion cond. on Li by electrochem. treatment in a mixed solvent of ethylene carbonate and propylene carbonate (6:1 ratio) contg. LiClO₄.

IT 7439-93-2, uses and miscellaneous
(anode, secondary battery, with lithium ion-
conductive film from electrochem. treatment in ethylene
carbonate)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC H01M010-40

CC 72-3 (Electrochemistry)

Section cross-reference(s): 76

ST lithium secondary battery anode; ethylene carbonate

electrochem treatment lithium; ionic conductive
film lithium battery; propylene ethylene carbonate lithium
anode

IT Anodes

(battery, secondary, lithium with lithium ion-
conductive film)

IT Electric conductors

(ionic, lithium-contg. film, on lithium for secondary
battery anode)

IT 7439-93-2, uses and miscellaneous

(anode, secondary battery, with lithium ion-
conductive film from electrochem. treatment in ethylene
carbonate)

IT 108-32-7

(lithium electrochem. treatment in ethylene carbonate with, for
anode for secondary battery)

IT 7791-03-9

(lithium electrochem. treatment in ethylene carbonate-propylene
carbonate contg., for anode for secondary battery)

IT 96-49-1

(lithium electrochem. treatment in propylene carbonate with, for
anode for secondary battery)

L120 ANSWER 17 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 101:45464 HCA Full-text

TI Solid electrolyte battery

PA Sanyo Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 3 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	JP 59029381	A	19840216	JP 1982-139607 ^o
				198208
				10

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PRAI JP 1982-139607 19820810 <--

AB A solid-electrolyte battery is described, which consists of a Li anode, Li-ion-conductive solid electrolyte, and cathode. A fluoropolymer protective film is used to cover at least a portion of back and side surfaces of the Li anode and to control selfdischarging. Thus, a Li anode having a PTFE or tetrafluoroethylene- hexafluoropropylene copolymer coating at the back side was used together with a poly(vinylpyridine) and I cathode and LiI solid electrolyte.

IT 7439-93-2, uses and miscellaneous

(anodes, partially coated with fluoropolymer, for
solid-electrolyte battery)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC H01M006-18

CC 72-3 (Electrochemistry)
ST fluoropolymer coating anode lithium battery
IT Fluoropolymers
(lithium anode partially coated with, for
solid-electrolyte battery)
IT Batteries, primary
(solid-electrolyte, with lithium anode partially
covered with fluoropolymer)
IT 7439-93-2, uses and miscellaneous
(anodes, partially coated with fluoropolymer, for
solid-electrolyte battery)
IT 34503-47-4
(cathode, in solid electrolyte battery with lithium anode
partially covered with fluoropolymer)
IT 9002-84-0 25067-11-2
(lithium anode partially coated with, for
solid-electrolyte battery)
IT 10377-51-2
(solid electrolyte, in battery with lithium anode
partially covered with fluoropolymer)

L120 ANSWER 18 OF 18 HCA COPYRIGHT 2007 ACS on STN

AN 100:212914 HCA [Full-text](#)

TI Nitrite molten salt for use in intermediate-temperature lithium
cells

AU Poris, J.; Raistrick, I. D.; Huggins, R. A.

CS Dep. Mater. Sci. Eng., Stanford Univ., Stanford, CA, 94305, USA

SO Proceedings - Electrochemical Society (1984), 84-2(Molten
Salts), 313-21

CODEN: PESODO; ISSN: 0161-6374

DT Journal

LA English

AB LiNO₂-KNO₂ (40-50 mol%) molten salt, m. 120° was employed as an electrolyte in intermediate-temp. Li cells. The behavior of Li in this electrolyte is analogous to the behavior of Li in the similar intermediate-temp. alkali-nitrate electrolyte. Li reacts with the melt to form a thin, Li-ion conducting, protective layer, which is believed to be Li₂O. The electrolyte is electrochem. reduced at <1.9 V vs. Li⁺/Li, and is oxidized to Li and NO₂ at >3.5 V vs. Li⁺/Li. This electrolyte can be used in secondary cells with Li or high Li-activity anodes, and lower Li-activity cathodes which react reversibly with Li. The resistance of the protective layer on Li increases with time as the thickness increases; its resistance being 10 Ω after 10 h at 150°.

IT 7439-93-2, reactions
(corrosion of, in nitrite electrolyte in intermediate-temp.
batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

IT Electric resistance
(of protective layer on lithium in nitrite
melt)

IT 7439-93-2, reactions
(corrosion of, in nitrite electrolyte in intermediate-temp.
batteries)

=> D HIS L121-

FILE 'HCA' ENTERED AT 13:06:38 ON 15 AUG 2007

L121 35167 S $\Omega(2W)$ CM
L122 9 S L4 AND L121
L123 1662 S (COND# OR CONDUCT?)(3A)L121
L124 46 S L2 AND L3 AND L121
L125 3 S (L122 OR L124) AND (L5 OR L30 OR L49 OR L50)
L126 0 S L125 NOT (L28 OR L29 OR L118 OR L120)

(CLAIMS 4-5)

=> D L59 1-12 BIB ABS HITSTR HITIND

L59 ANSWER 1 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 140:397634 HCA Full-text

TI Conducting solids

AU Gover, R. K. B.; Slater, P. R.

CS School of Chemistry, University of Durham, Durham, DH1 3LE, UK

SO Annual Reports on the Progress of Chemistry, Section A: Inorganic
Chemistry (2003), 99, 477-504

CODEN: APCCDO; ISSN: 0260-1818

PB Royal Society of Chemistry

DT Journal; General Review

LA English

AB A review. Fujiwara et al. have developed a novel method for prepg. **cryst. LiCoO₂ cathode films** on paper using an electrodeposition method from solns. of LiOH and CoSO₄ at 120°C. This year has also seen a move toward hybrid **lithium anode materials** by a no. of different research groups, with interesting electrochem. properties being reported for a wide range of materials. In terms of solid oxide fuel cell (SOFC) research, fluorite-type electrolytes (such as yttria stabilized zirconia) have long dominated the area. Alternative electrolyte materials are however rapidly growing in stature, and represent key highlights of the research in 2002. In particular, promising results from single cell SOFCs based on doped LaGaO₃ have been reported by Ishihara et al. Promising oxide ion cond. has also been reported in apatite-type oxides by a no. of groups. In terms of supercond. research, lithium has been shown to be superconducting under high pressure, with T_c as high as 20 K, which represents the highest T_c for any element.

IT 7439-93-2D, Lithium, derivs.
(conducting solids)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 76-0 (Electric Phenomena)
Section cross-reference(s): 52

IT Anodes

Electric conductors
Fuel cell electrolytes
(conducting solids)

IT Ionic conductivity

(in apatite-type oxides; conducting solids)

IT 7439-93-2D, Lithium, derivs.

(conducting solids)

RE.CNT 169 THERE ARE 169 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L59 ANSWER 2 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 139:263265 HCA [Full-text](#)

TI All-solid-state Li/S batteries with
highly conductive glass-ceramic electrolytes

AU Hayashi, Akitoshi; Ohtomo, Takamasa; Mizuno, Fuminori; Tadanaga,
Kiyoharu; Tatsumisago, Masahiro

CS Graduate School of Engineering, Department of Applied Materials
Science, Osaka Prefecture University, Sakai, Osaka, 599-8531, Japan

SO Electrochemistry Communications (2003), 5(8), 701-705

CODEN: ECCMF9; ISSN: 1388-2481

PB Elsevier Science B.V.

DT Journal

LA English

AB All-solid-state cells using sulfur-based cathode materials and Li₂S-P₂S₅ glass-ceramic electrolytes were successfully prepd. and exhibited excellent cycling performance at room temp. The cathode materials consisting of sulfur and CuS were synthesized by mech. milling using sulfur and copper crystals as starting materials. The cell performance was influenced by the milling time of the cathode materials and the cell with cathode materials obtained by milling for 15 min retained large capacities >650 mA-h/g after 20 cycles. Sulfur as well as CuS in cathode materials proved to be utilized as active materials during charge-discharge processes in the all-solid-state Li/S cells.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium sulfur battery glass ceramic

electrolyte; phosphorus sulfide lithium sulfide glass ceramic

electrolyte; copper sulfide sulfur cathode lithium

battery

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L59 ANSWER 3 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 136:105050 HCA [Full-text](#)

TI Crystallographically oriented thin-film nanocrystalline cathode
layers prepared without exceeding 300°C

AU Whitacre, J. F.; West, W. C.; Brandon, E.; Ratnakumar, B. V.

CS Electrochemical Technologies Group, Center for Integrated Space
Microsystems, Jet Propulsion Laboratory, California Institute of
Technology, Pasadena, CA, 91109, USA

SO Journal of the Electrochemical Society (2001), 148(10),

A1078-A1084

CODEN: JESQAN; ISSN: 0013-4651

PB Electrochemical Society

DT Journal

LA English

AB The highest capacity rf sputtered cathode layers created for use in thin-film solid-state batteries require an annealing step with temps. in excess of 700°C. Since this high-temp. process step is incompatible with silicon device technol. and flexible polymer substrates, the development of a low-process temp. (less than or equal to 300°C) cathode layer has been undertaken. Thin-film cathode layers consisting of LiCoO₂ were deposited by using planar magnetron rf sputtering and

subsequently incorporated into thin-film solid-state cells comprised of a LiPON electrolyte and lithium metal anode. Film compn. was examd. using Rutherford backscattering spectrometry and inductively coupled plasma mass spectroscopy, while phase content and crystal structure were studied through X-ray diffraction expts. conducted at the Stanford Synchrotron Radiation Lab. Microstructure and morphol. were examd. using transmission and SEM. It was found that LiCoO₂ could be deposited at room temp. in a nanocryst. state with a defined (104) out of plane texture and a high degree of lattice distortion. By heating these layers to 300°C, the av. grain size was increased while lattice distortion was minimized. Electrochem. cycling data revealed that the low temp. annealing step increases cell capacity to near theor. values while significantly improving both the rate capability and discharge voltage. Impedance anal. on test cells showed that the electronic resistance of the cells is decreased after heating to 300°C.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 12190-79-3, Cobalt lithium oxide LiCoO₂

(crystallog. oriented thin-film nanocryst.

cathode layers prepd. without exceeding 300°C)

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L59 ANSWER 4 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 136:38098 HCA [Full-text](#)

TI Conductive polymeric compositions for lithium batteries

IN Angell, Charles A.; Xu, Wu

PA Arizona State University, Board of Regents, USA

SO PCT Int. Appl., 53 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 3

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2001096446	A1	20011220	WO 2001-US41009	
			200106	
			16	

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W: CA, JP, KR, US

RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR

CA 2412818	A1	20011220	CA 2001-2412818	
			200106	
			16	

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EP 1292633	A1	20030319	EP 2001-944709	
			200106	
			16	

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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR

JP 2004511879	T	20040415	JP 2002-510578	
			200106	
			16	

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US 2004054126	A1	20040318	US 2003-311643	
			200309	
			03	

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PRAI US 2000-212231P	P	20000616	<--	
US 2001-290864P	P	20010514	<--	

WO 2001-US41009 W 20010616 <--

- AB The polymers comprise weakly basic anionic moieties in a polyether backbone at controllable anionic sepn., preferably orthoborate anions capped with dibasic acid residues, preferably oxalato or malonato acid residues and lithium cations. The cond. of the polymers is high relative to that of most conventional salt-in-polymer electrolytes. The cond. at high temp. and wide electrochem. window make these materials esp. suitable as solid polymer electrolytes for rechargeable lithium batteries. A Lewis base contg. polymer electrolyte was prepd. by reaction of oxalato-capped orthoboric acid [formed from LiOH, oxalic acid dihydrate and boric acid] with poly(ethylene glycol), producing a rubbery or cryst. material.
- IT 7439-93-2, Lithium, uses
(anode; lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)
- RN 7439-93-2 HCA
- CN Lithium (CA INDEX NAME)

Li

- IT 7439-93-2DP, Lithium, oxalato-capped orthoboric acid-PEG complexes
(lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)
- RN 7439-93-2 HCA
- CN Lithium (CA INDEX NAME)

Li

- IC ICM C08G079-08
ICS H01M010-44; H01M002-38
- CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 36, 52, 76
- IT Battery electrolytes
Ionic conductivity
Lewis acidity
Polymer electrolytes
(lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)
- IT 7439-93-2, Lithium, uses
(anode; lithium - oxalato-capped orthoboric acid-polyoxyalkylene and polysiloxane electrolytes for lithium batteries)
- IT 141-82-2DP, Malonic acid, polymers with ethylene glycol and reaction products with oxalato-borate, lithium complexes 3768-58-9DP, Bis(dimethylamino)-dimethylsilane, polymers with ethylene glycol and reaction products with oxalato-borate, lithium complexes 7439-93-2DP, Lithium, oxalato-capped orthoboric acid-PEG complexes 9016-00-6DP, Dimethyl siloxane, polymers with ethylene glycol and reaction products with oxalato-borate, lithium complexes 10043-35-3DP, Orthoboric acid, oxalato-capped, reaction products with PEG, lithium complexes, preparation 25322-68-3DP, Poly(ethylene glycol), reaction products with oxalato-capped

orthoboric acid and with dimethylsiloxane, lithium complexes
(lithium - oxalato-capped orthoboric acid-polyoxyalkylene and
polysiloxane electrolytes for lithium batteries)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L59 ANSWER 5 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 135:48567 HCA Full-text

TI Method for preparation of lithium cobalt oxides for use as cathodes
of lithium-ion secondary batteries

IN Yakovleva, Marina; Gao, Yuan; Burba, John L., III; Engel, John F.

PA FMC Corporation, USA

SO PCT Int. Appl., 63 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	WO 2001042141	A1	20010614	WO 2000-US33137
				200012
				07

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W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES,
FI, FL, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK,
SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW,
AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,
TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD,
TG

US 2002127175	A1	20020912	US 2000-731949
			200012
			07

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US 6579475	B2	20030617	
EP 1242311	A1	20020925	EP 2000-982491
			200012
			07

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EP 1242311	B1	20030502	
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR			
JP 2003516297	T	20030513	JP 2001-543448
			200012
			07

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TW 539647	B	20030701	TW 2000-89126161
			200012
			08

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US 2003205700	A1	20031106	US 2003-424056
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US 6932922 B2 20050823
PRAI US 1999-170221P P 19991210 <--
US 2000-731949 A3 20001207 <--
WO 2000-US33137 W 20001207 <--

AB The present invention includes lithium cobalt oxides having hexagonal layered crystal structures and methods of making same. The lithium cobalt oxides of the invention have the formula $\text{Li}_w\text{Co}_1\text{-xAxO}_2\text{+y}$ wherein $0.96 \leq w \leq 1.05$, $0 \leq x \leq 0.05$, $-0.02 \leq y \leq 0.02$ and A is one or more dopant. The lithium cobalt oxides of the invention preferably have a position within the principal component space defined by the relationship $\text{axi} + \text{byi} \leq \text{c}$, wherein $\text{xi} = \text{i.Pc1}$; $\text{yi} = \text{Si.Pc2}$; the vector Si is the x-ray spectrum for the $\text{Li}_w\text{Co}_1\text{-xAxO}_2\text{+y}$ compd.; the vectors Pc1 and Pc2 defining the principal component space are detd. by measuring the x-ray powder diffraction values Si between 15° and 120° using a 0.02° step size and $\text{CuK}\alpha$ rays for a large sample set of lithium cobalt oxides and using the regression of Si of the sample set against the capacity fade after 50 cycles of a lithium coin cell that includes a lithium neg. electrode and the lithium cobalt oxide as the pos. electrode material and that is cycled between 3.0 and 4.3 V at a const. current of C/3 during both charge and discharge cycles; and the values a, b and c are detd. by using only the xi and yi values for $\text{Li}_w\text{Co}_1\text{-xAxO}_2\text{+y}$ compds. in the sample set that have a capacity fade after 50 cycles of less than or equal to 15%.

IT 7439-93-2, Lithium, uses
(method for prepn. of lithium cobalt oxides for use as cathodes
of lithium-ion secondary batteries)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IC ICM C01G051-00
ICS H01M004-52
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate
7439-93-2, Lithium, uses 21324-40-3, Lithium
hexafluorophosphate 39300-70-4, Lithium nickel oxide 39457-42-6,
Lithium manganese oxide
(method for prepn. of lithium cobalt oxides for use as cathodes
of lithium-ion secondary batteries)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L59 ANSWER 6 OF 12 HCA COPYRIGHT 2007 ACS on STN
AN 134:149886 HCA Full-text
TI Thin-film lithium and lithium-ion batteries
AU Bates, J. B.; Dudney, N. J.; Neudecker, B.; Ueda, A.; Evans, C. D.
CS Oak Ridge National Laboratory, Oak Ridge, TN, 37831-6030, USA
SO Solid State Ionics (2000), 135(1-4), 33-45
CODEN: SSIOD3; ISSN: 0167-2738
PB Elsevier Science B.V.
DT Journal; General Review
LA English

AB A review with 33 refs. Research over the last decade at Oak Ridge National Lab. has led to the development of solid-state thin-film lithium and lithium-ion batteries. The batteries, which are less than 15 μm thick, have important applications in a variety of consumer and medical products, and they are useful research tools in characterizing the properties of lithium

intercalation compds. in thin-film form. The batteries consist of cathodes that are cryst. or nanocryst. oxide-based lithium intercalation compds. such as LiCoO_2 and LiMn_2O_4 , and anodes of lithium metal, inorg. compds. such as silicon-tin oxynitrides, Sn_3N_4 and Zn_3N_2 , or metal films such as Cu in which the anode is formed by lithium plating on the initial charge. The electrolyte is a glassy lithium phosphorus oxynitride ("Lipon"). Cells with cryst. LiCoO_2 cathodes can deliver up to 30% of their max. capacity between 4.2 and 3 V at discharge currents of 10 mA/cm², and at more moderate discharge-charge rates, the capacity decreases by negligible amts. over thousands of cycles. Thin films of cryst. lithium manganese oxide with the general compn. $\text{Li}_{1+x}\text{Mn}_{2-y}\text{O}_4$ exhibit on the initial charge significant capacity at 5 V and, depending on the deposition process, at 4.6 V as well, as a consequence of the manganese deficiency-lithium excess. The 5-V plateau is believed to be due to oxidn. Mn of ions to valence states higher than +4 accompanied by a rearrangement of the lattice. The gap between the discharge-charge curves of cells with as-deposited nanocryst. $\text{Li}_{1+x}\text{Mn}_{2-y}\text{O}_4$ cathodes is due to a true hysteresis as opposed to a kinetically hindered relaxation obsd. with the highly cryst. films. This behavior was confirmed by observing classic scanning curves on charge and discharge at intermediate stages of insertion and extn. of Li^+ ions. Extended cycling of lithium cells with these cathodes at 25 and 100°C leads to grain growth and evolution of the charge-discharge profiles toward those characteristic of well crystd. films.

CC 52-0 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

RE.CNT 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L59 ANSWER 7 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 131:93929 HCA [Full-text](#)

TI Slurry for coating non-carbon metal-based anodes for
aluminium production cells

IN De Nora, Vittorio; Duruz, Jean-Jacques

PA Moltech Invent S.A., Luxembourg

SO PCT Int. Appl., 24 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 10

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9936593	A1	19990722	WO 1999-IB81	19990119

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W: AT, AU, BR, CA, CH, CN, CZ, DE, DK, ES, GB, GH, HU, ID, IN,
IS, JP, KP, KR, MX, NO, NZ, PL, RO, RU, SE, SI, SK, TJ, TR,
UA, US, YU, AM, AZ, BY, KG, KZ, MD, TM

RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK,
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

US 6365018	B1	20020402	US 1998-126359	19980730
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CA 2317802	A1	19990722	CA 1999-2317802	19990119
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AU 9917797	A	19990802	AU 1999-17797	19990119
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AU 747903	B2	20020530		
EP 1049817	A1	20001108	EP 1999-900109	

199901
19

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EP 1049817 B1 20061102
R: DE, ES, FR, GB, IT, NL
NO 2000003702 A 20000719 NO 2000-3702
200007
19

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US 2002092765 A1 20020718 US 2002-992805
200203
14

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US 6656520 B2 20031202
US 2003070937 A1 20030417 US 2002-303285
200211
25

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US 6913682 B2 20050705
PRAI WO 1998-IB81 A 19980120 <--
US 1998-126359 A 19980730 <--
WO 1999-IB81 W 19990119 <--
US 2001-772286 A1 20010129 <--

AB A method of coating an electronically conductive and heat resistant substrate of an **anode** of a cell for the electrowinning of metals, in particular a cell for the electrowinning of aluminum, to **protect** and make the surface of the **anode** active for the oxidn. of the oxygen ions present in the electrolyte. The method comprises applying onto the substrate a slurry comprising at least one oxide or oxide precursor as a nondispersed but suspended particulate in a colloidal and/or inorg. polymeric carrier. The applied-slurry is then solidified and made adherent to the substrate upon heat treatment to form an adherent, **protective**, predominantly oxide-contg. coating. The colloidal and/or inorg. polymeric carrier may comprise at least one of alumina, ceria, lithia, magnesia, silica, thoria, yttria, zirconia, tin oxide and zinc oxide. The oxide of the coating may be a chromite or a ferrite, such as a ferrite selected from cobalt, copper, manganese, nickel and zinc.

IT 7439-93-2, Lithium, uses
(spinel doped with lithium in slurry for coating non-carbon metal-based **anodes** for aluminum prodn. cells)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IC ICM C25C003-12
ICS C25C007-02

CC 72-2 (Electrochemistry)
Section cross-reference(s): 54, 56, 67

ST slurry coating noncarbon metal **anode** aluminum prodn cell;
metal electrowinning slurry coating noncarbon metal **anode**

IT Electrowinning
(aluminum; slurry for coating non-carbon metal-based **anodes** for aluminum prodn. cells)

IT Rare earth metals, uses
(electrocatalysts in slurry for coating non-carbon metal-based **anodes** for aluminum prodn. cells and for **anodes** in electrowinning of lanthanides)

IT Colloids

- (in slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT Polymers, uses
 - (inorg.; in slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT Anodes
 - Coating process
 - Perovskite-type crystals
 - Slurries
 - Spinel-type crystals
 - (slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT Metals, processes
 - (slurry for coating non-carbon metal-based anodes for electrowinning of)
- IT Electrowinning
 - (slurry for coating non-carbon metal-based anodes metal)
- IT Transition metal compounds
 - Transition metals, uses
 - (substrate in slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT 1306-38-3, Ceria, uses
 - (Inconel precoated with ceria then slurry coated for non-carbon metal-based anodes for aluminum prodn. cells)
- IT 7439-88-5, Iridium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon, uses 7440-31-5, Tin, uses 7440-66-6, Zinc, uses
 - (electrocatalysts in slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT 7429-90-5P, Aluminum, preparation
 - (electrowinning; slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT 1313-99-1, Nickel oxide (NiO), uses 12168-54-6, Iron nickel oxide Fe_2NiO_4
 - (in slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT 12004-35-2P, Aluminum nickel oxide Al_2NiO_4 12053-26-8P, Chromium magnesium oxide Cr_2MgO_4
 - (in slurry for coating non-carbon metal-based anodes for aluminum prodn. cells)
- IT 12606-02-9, Inconel
 - (precoated with ceria then slurry coated for non-carbon metal-based anodes for aluminum prodn. cells)
- IT 1309-48-4, Magnesia, uses 1314-13-2, Zinc oxide, uses 1314-20-1, Thoria, uses 1314-23-4, Zirconia, uses 1314-36-9, Ytria, uses 1344-28-1, Aluminum oxide (Al_2O_3), uses 7631-86-9, Silica, uses 12009-92-6, Beryllium chromium oxide BeCr_2O_4 12013-31-9, Calcium chromium oxide CaCr_2O_4 12016-69-2, Chromium cobalt oxide Cr_2CoO_4 12018-10-9, Chromium copper oxide Cr_2CuO_4 12018-15-4, Chromium manganese oxide Cr_2MnO_4 12018-18-7, Chromium nickel oxide Cr_2NiO_4 12018-19-8, Chromium zinc oxide Cr_2ZnO_4 12018-79-0, Copper iron oxide CuFe_2O_4 12052-28-7, Cobalt iron oxide CoFe_2O_4 12057-24-8, Lithia, uses 12063-10-4, Iron manganese oxide Fe_2MnO_4 12063-19-3, Iron zinc oxide Fe_2ZnO_4 12068-77-8, Chromium iron

oxide cr2feo4 12344-99-9, Barium chromium oxide bacr2o4
12381-54-3, Chromium strontium oxide cr2sro4 13463-67-7, Titania,
uses 18282-10-5, Tin oxide sno2 39336-05-5, Chromium yttrium
oxide

(slurry for coating non-carbon metal-based anodes for
aluminum prodn. cells)

IT 7429-90-5P, Aluminum, processes

(slurry for coating non-carbon metal-based anodes for
aluminum prodn. cells)

IT 7440-00-8P, Neodymium, processes

(slurry for coating non-carbon metal-based anodes for
cell for electrowinning of)

IT 7782-44-7P, Oxygen, preparation

(slurry for coating non-carbon metal-based anodes for
oxygen evolution in aluminum prodn. cells)

IT 7439-93-2, Lithium, uses

(spinel doped with lithium in slurry for coating non-carbon
metal-based anodes for aluminum prodn. cells)

IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1,

Niobium, uses 7440-25-7, Tantalum, uses 7440-32-6, Titanium,

uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses

7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-58-6,

Hafnium, uses 7440-62-2, Vanadium, uses 7440-65-5, Yttrium, uses

7440-67-7, Zirconium, uses

(substrate in slurry for coating non-carbon metal-based
anodes for aluminum prodn. cells)

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L59 ANSWER 8 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 123:261106 HCA [Full-text](#)

TI Layered crystalline oxides for

positive electrodes in secondary batteries

IN Maruyama, Satoshi; Kondo, Makoto

PA Tdk Corp., Japan

SO Eur. Pat. Appl., 20 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI EP 672622	A1	19950920	EP 1994-305245	
			199407	
			18	

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EP 672622	B1	19981028		
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R: DE, FR, GB, IT

US 5503930	A	19960402	US 1994-273691	
			199407	
			12	

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JP 08055624	A	19960227	JP 1994-247281	
			199409	
			14	

<--

JP 3307510 B2 20020724
PRAI JP 1994-62107 A 19940307 <--
JP 1994-95563 A 19940408 <--
JP 1994-150475 A 19940608 <--

AB The layered cryst. oxides have general formula AMO_2 ($A = \text{Li or Na}$; $M = \text{Co, Ni, Fe or Cr}$) and contain ≥ 1 elements Z ($Z = \text{Bi, Pb or B}$) in the form of an oxide on the surface of, or between, crystallites. The Z/M at. ratio is 0.0001-0.1. As the crystallites have increased size, the layered oxides have improved properties, and are suitable for use as pos. electrode material of secondary batteries.

IT 7439-93-2, Lithium, uses
(neg. electrode; layered
cryst. oxides for pos. electrodes in secondary
batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IC ICM C01G051-00

CC 49-3 (Industrial Inorganic Chemicals)

Section cross-reference(s): 52

IT Oxides, preparation
(layered; layered cryst.
oxides for pos. electrodes in secondary batteries)

IT Electrodes
(battery, pos.; layered cryst. oxides
for)

IT 7791-03-9, Lithium perchlorate
(electrolyte; in propylene carbonate; layered
cryst. oxides for pos. electrodes in secondary
batteries)

IT 145954-28-5P, Cobalt lead lithium oxide ($\text{Co}_{0.9}\text{Pb}_{0.1}\text{LiO}_2$)
169227-15-0P, Bismuth cobalt lithium oxide ($\text{Bi}_{0.01}\text{CoLiO}_2$)
169227-16-1P, Cobalt lead borate oxide ($\text{CoPb}_{0.01}(\text{BO}_3)_{0.01}\text{O}_{1.97}$)
(layered cryst. oxides for pos.
electrodes in secondary batteries)

IT 554-13-2, Lithium carbonate 1304-76-3, Bismuth oxide,
uses 7542-09-8, Cobalt carbonate
(layered cryst. oxides for pos.
electrodes in secondary batteries)

IT 7439-93-2, Lithium, uses
(neg. electrode; layered
cryst. oxides for pos. electrodes in secondary
batteries)

L59 ANSWER 9 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 114:110581 HCA [Full-text](#)

TI Lithium insertion and ion exchange reactions in the ionic conducting
thallium-metal titanate ($\text{Ti}_2(\text{M,Ti})_8\text{O}_{16}$) phases with hollandite-type
structure

AU Wang, E.; Tarascon, J. M.; Colson, S.; Tsai, M.

CS Bellcore, Red Bank, NJ, 07701, USA

SO Journal of the Electrochemical Society (1991), 138(1),
166-72

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

AB Ion exchange reactions and Li insertion in the $Ti_2(M_xTi_{8-x})O_{16}$ (M is transition metal and $x = 1,2$) hollandite-type structure compds. have been investigated. Several new phases were synthesized at 450° by an ion exchange reaction using alkali halide salts. A correlation between the ionicity of the M-O bonds and cond. was confirmed, but no samples exhibited an ionic cond. exceeding $10^{-4} \Omega^{-1} \text{ cm}^{-1}$ at 200° . For the first time it was shown that Li can be chem. or electrochem. intercalated into hollandite-type phases as $Li_xTi_2MTi_7O_y$ with x ranging from 0 to 6. Electrochem. and in situ x-ray powder diffraction measurements have shown that Li insertion in these compds. proceeds at voltages lower than 1.2 V and is partially reversible. Upon lithiation, the material undergoes a reversible phase transition. Because of their low Li intercalation voltages, these materials could possibly be used as anodes, instead of Li metal, in secondary Li cells.

IT 7439-93-2, Lithium, reactions

(insertion of, in thallium-transition metal titanate)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 72-2 (Electrochemistry)

Section cross-reference(s): 75, 76, 78

IT Crystal structure

(of thallium-transition metal titanate, lithium
and sulfur effect on)

IT Electric conductivity and conduction

Lithiation

(of thallium-transition metal titanates)

IT 132496-13-0, Aluminum potassium titanium oxide

($Al_2K_0-2Ti_6O_{16}$) 132496-14-1, Aluminum sodium titanium
oxide ($Al_2Na_0-2Ti_6O_{16}$) 132496-36-7, Cesium magnesium
titanium oxide ($Cs_0-2MgTi_7O_{16}$) 132496-37-8, Magnesium
rubidium titanium oxide ($MgRb_0-2Ti_7O_{16}$) 132519-09-6,
Magnesium potassium titanium oxide ($MgK_0-2Ti_7O_{16}$)

132519-10-9, Magnesium sodium titanium oxide

($MgNa_0-2Ti_7O_{16}$) 132519-11-0, Aluminum cesium titanium
oxide ($Al_2Cs_0-2Ti_6O_{16}$) 132519-12-1, Aluminum rubidium
titanium oxide ($Al_2Rb_0-2Ti_6O_{16}$)

(crystal lattice of)

IT 132495-43-3, Iron thallium titanate ($Fe_2Tl_{1.5}Ti_6O_{16}$) 132495-58-0,

Chromium thallium titanium oxide ($Cr_2TlTi_6O_{16}$)

132495-59-1, Cobalt thallium titanium oxide ($CoTl_2Ti_7O_{16}$)

132496-15-2, Manganese thallium titanate ($Mn_2Tl_{1.2}Ti_6O_{16}$)

132496-16-3, Aluminum thallium titanium oxide

($Al_2Tl_{1.1}Ti_6O_{16}$) 132496-17-4, Thallium zinc titanate

($Tl_{1.5}ZrTi_7O_{16}$) 132496-18-5, Nickel thallium titanate

($NiTl_{1.7}Ti_7O_{16}$) 132496-19-6, Magnesium thallium titanate

($MgTl_{1.8}Ti_7O_{16}$)

(crystal structure and electrochem. insertion of
lithium in)

IT 7439-93-2, Lithium, reactions

(insertion of, in thallium-transition metal titanate)

L59 ANSWER 10 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 108:8781 HCA [Full-text](#)

TI Chemical analysis of charged lithium-sulfur dioxide cells

AU Subbarao, S.; Lawson, D.; Frank, H.; Halpert, G.; Barnes, J.; Bis, R.

CS Jet Propul. Lab., California Inst. Technol., Pasadena, CA, 91109, USA

SO Journal of Power Sources (1987), 21(3-4), 227-37

CODEN: JPSODZ; ISSN: 0378-7753

DT Journal

LA English

AB The Li anodes of charged and discharged Li/SO₂ batteries were coated with cryst. platelets, but the Li anodes of partially discharged batteries were covered with rough, nonadherent deposits of Li₂S₂O₄; the changed anodes are pyrophoric. The explosion that can occur when a Li/SO₂ battery is charged is due to runaway reaction of Li with SO₂ and the formation of Li₂S₂O₄; the runaway reaction is most likely initiated by the thermal effects of exothermic reactions, elec. resistance heating, etc. Extreme care should be taken to avoid changing of Li/SO₂ batteries.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium sulfur dioxide battery safety;

safety charging lithium battery; explosion hazard lithium battery

IT Explosion

(hazard, of lithium-sulfur dioxide batteries)

IT Batteries, primary

(lithium-sulfur dioxide, reactions during charging of, safety in relation to)

IT 59744-77-3

(detection of, in lithium-sulfur dioxide batteries, charging hazard in relation to)

L59 ANSWER 11 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 106:87635 HCA [Full-text](#)

TI Investigation of a vitreous electrolyte for use in lithium/sulfur cells

AU Smith, M. L.; McLarnon, F. R.; Cairns, E. J.

CS Lawrence Berkeley Lab., CA, USA

SO Report (1985), LBL-20737; Order No. DE86011192, 110 pp.

Avail.: NTIS

From: Energy Res. Abstr. 1986, 11(15), Abstr. No. 34106

DT Report

LA English

AB Novel Li/S cells, which employed a fast-Li-ion conducting Li chloroborate glass as the solid electrolyte, were built and operated at 400°. The compn. of the glass used for this study was (LiCl)₂ 7.3 mol% and Li₂O and B₂O₃ 67.0 mol%; and it had an ionic cond. of $2.9 \times 10^{-3} (\Omega\text{-cm})^{-1}$ at 400°, which was somewhat lower than those of other Li chloroborate glasses. The current-voltage characteristics of these cells were capable of supporting pseudo-steady-state current densities of $\leq 15 \text{ mA/cm}^2$ for 15-20 h. A limiting current existed at approx. 23 mA/cm². These cells could be charged and discharged with approx. equal polarization in either direction. However, the accumulation of a cryst. reaction layer on the surface of the electrolyte during discharge caused the cells to fail before the completion of a full charge-discharge cycle. These cells were also used to measure the soly. of Li₂S_x in S. The soly. limit occurred at 0.04 mol% Li at 400°.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 57

ST glass electrolyte lithium sulfur battery

; chloroborate glass battery electrolyte; polysulfide lithium soly sulfur

IT Glass, oxide

(chloroborate, electrolytes, in lithium-sulfur batteries)

IT Batteries, secondary
(lithium-sulfur, vitreous electrolyte for)

IT Electric conductivity and conduction
(ionic, of lithium chloroborate glass, for lithium-sulfur batteries)

IT 7447-41-8, Lithium chloride (LiCl), properties 12057-24-8, Lithium oxide (Li₂O), properties
(chloroborate glasses contg., ionic cond. of, for lithium-sulfur batteries)

IT 7704-34-9, Sulfur, properties
(soly. in, of lithium polysulfide, measurement of, lithium-sulfur batteries in)

IT 66559-78-2
(soly. of, in sulfur, measurement of, lithium-sulfur batteries in)

L59 ANSWER 12 OF 12 HCA COPYRIGHT 2007 ACS on STN

AN 95:194349 HCA [Full-text](#)

TI The behavior of the lithium/lithium nitride interface under anodic polarization

AU Von Alpen, U.; Bell, M. F.

CS VARTA Batterie A.-G., Kelkheim, D-6233, Fed. Rep. Ger.

SO Solid State Ionics (1981), 3-4, 259-62

CODEN: SSIOD3; ISSN: 0167-2738

DT Journal

LA English

AB The kinetics of Li transport across the interface formed by melting Li onto a Li₃N sinter was studied using a linear potential sweep technique. A mode, which allows the calcn. of the product of concn. and diffusion coeff. to be calcd. is proposed to account for the obsd. behavior. In this model, it is suggested that the 2nd mobile species, required for electroneutrality, is H introduced into the samples during prepn. IR absorption measurements carried out on a Li₃N single crystal during polarization between Li electrodes show that both Li ions and H ions are mobile.

IT 7439-93-2, properties
(anodic polarization of lithium nitride interface with, lithium transport in relation to)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 72-7 (Electrochemistry)

Section cross-reference(s): 76

ST anodic polarization lithium nitride interface; cond ionic lithium nitride

IT Electrolytic polarization
(anodic, at lithium-lithium nitride interface, lithium transport in relation to)

IT Electric conductivity and conduction
(ionic, of lithium nitride, hydrogen doping effect on)

IT 26134-62-3
(anodic polarization of lithium at interface with, lithium transport in relation to)

IT 7439-93-2, properties
(anodic polarization of lithium nitride interface with,
lithium transport in relation to)
IT 1333-74-0, properties
(elec. cond. of lithium nitride crystals
doped with)

(CLAIM 6)

=> D L101 1-21 BIB ABS HITSTR HITIND

L101 ANSWER 1 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 142:264352 HCA [Full-text](#)

TI Composition for protecting anode for
lithium metal battery

IN Hwang, Duck-Chul; Hwang, Seung-Sik; Cho, Chung-Kun; Lee, Sang-Mock

PA S. Korea

SO U.S. Pat. Appl. Publ., 12 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	
PI US 2005042515	A1	20050224	US 2004-923126	
			200408	
			19	
		<--		
JP 2005071998	A	20050317	JP 2004-239903	
			200408	
			19	
		<--		
CN 1645648	A	20050727	CN 2004-10095981	
			200408	
			20	
		<--		

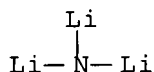
PRAI KR 2003-57689 A 20030820 <--

AB Disclosed is a compn. for protecting a neg. electrode for a lithium metal battery including a multifunctional monomer
having at least two double bonds for facilitating crosslinking, a plasticizer, and at least one alkali metal salt.

IT 26134-62-3, Lithium nitride (Li₃N)
(coating; compn. for protecting anode
for lithium metal battery)

RN 26134-62-3 HCA

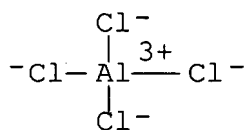
CN Lithium nitride (Li₃N) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses 14024-11-4, Lithium
tetrachloroaluminate
(compn. for protecting anode for
lithium metal battery)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 14024-11-4 HCA
CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



IC ICM H01M004-58
ICS H01M004-62; H01M004-48
INCL 429231950; 252182100; 429217000; 429231100
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST anode protection compn lithium
metal battery
IT Alcohols, uses
(alkoxy; compn. for protecting anode for
lithium metal battery)
IT Battery anodes
Coating materials
Ionic conductivity
Plasticizers
(compn. for protecting anode for
lithium metal battery)
IT Ethers, uses
(cyclic; compn. for protecting anode for
lithium metal battery)
IT Secondary batteries
(lithium; compn. for protecting anode for
lithium metal battery)
IT Lithium alloy, base
(compn. for protecting anode for
lithium metal battery)
IT 174674-36-3P

(coating; compn. for protecting anode
for lithium metal battery)

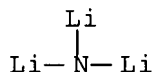
- IT 554-13-2, Lithium carbonate 10102-24-6, Lithium silicate
10377-52-3, Lithium phosphate 12676-27-6 **26134-62-3**,
Lithium nitride (Li₃N) 37220-89-6, Lithium aluminate 39302-37-9,
Lithium titanium oxide 152747-89-2, Lanthanum lithium oxide
184905-46-2, Lithium nitrogen phosphorus oxide 236388-73-1,
Lithium silicide sulfide 236388-74-2, Lithium boride sulfide
236388-75-3, Aluminum lithium sulfide 236388-76-4, Lithium
phosphide sulfide 342379-43-5, Germanium lithium sulfide
(coating; compn. for protecting anode
for lithium metal battery)
- IT 540-72-7, Sodium thiocyanate 556-65-0, Lithium thiocyanate
2923-17-3, Lithium trifluoroacetate 7439-93-2, Lithium,
uses 7440-44-0D, Carbon, sulfur compd., polymer 7601-89-0,
Sodium perchlorate 7704-34-9D, Sulfur, carbon compd., polymer
7791-03-9, Lithium perchlorate 10544-50-0, Sulfur s8, uses
13755-29-8, Sodium tetrafluoroborate **14024-11-4**, Lithium
tetrachloroaluminate 14075-53-7, Potassium tetrafluoroborate
14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium
hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate
33454-82-9, Lithium triflate 74432-42-1, Lithium polysulfide
89319-52-8, Ethylene glycol dimethacrylate-polyethylene glycol
methyl ether methacrylate copolymer 90076-65-6 108927-94-2
124634-22-6 131651-65-5, Lithium nonafluorobutanesulfonate
132843-44-8 133756-68-0 142289-27-8 195979-38-5 355838-46-9,
Polyethylene glycol dimethacrylate-polyethylene glycol ethyl ether
methacrylate copolymer 455921-75-2 845778-95-2 845778-97-4
845779-00-2 845779-09-1 845779-16-0 845779-19-3 845779-22-8
(compn. for protecting anode for
lithium metal battery)
- IT 110-71-4 111-96-6, Bis(2-methoxyethyl ether) 112-49-2,
Triethylene glycol dimethyl ether 143-24-8, Tetraethylene glycol
dimethyl ether 646-06-0, Dioxolane 7778-85-0, Propylene glycol
dimethyl ether 24991-55-7, Polyethylene glycol dimethyl ether
(compn. for protecting anode for
lithium metal battery)
- IT 84-51-5, 2-EthylAnthraquinone 84-65-1, Anthraquinone 86-74-8,
Carbazole 93-97-0, Benzoyl benzoate 98-86-2, Acetophenone,
processes 119-53-9, Benzoin 119-61-9, Benzophenone, processes
120-51-4, Benzyl benzoate 131-09-9, 2-ChloroAnthraquinone
131-56-6, 2,4-DihydroxyBenzophenone 131-57-7, 2-Hydroxy-4-
methoxybenzophenone 134-85-0, p-ChloroBenzophenone 150-60-7,
Benzyl disulfide 431-03-8, Butanedione 486-25-9, Fluorenone
492-22-8, Thioxanthone 574-09-4, Benzoinethylether 947-19-3,
1-Hydroxycyclohexyl phenyl ketone 2648-61-5 2902-69-4
6175-45-7, 2,2-DiethoxyAcetophenone 6652-29-5, Benzoin phenyl
ether 7473-98-5, 2-Hydroxy-2-methylpropiophenone 22499-12-3,
Benzoinisobutylether 24650-42-8, 2,2-DimethoxyphenylAcetophenone
27962-49-8 72896-34-5, ChloroThioxanthone 75081-21-9, Isopropyl
Thioxanthone
(photoinitiator; compn. for protecting anode
for lithium metal battery)
- IT 80-15-9, Cumyl hydroperoxide 94-36-0, Benzoyl peroxide, processes
110-05-4, Di-tert-butyl peroxide 110-22-5, Acetyl peroxide
2895-03-6, Dilauryl peroxide 13472-08-7, 2,2'-

Azobisisoaleronitrile 66205-07-0, 2,2'-Azobisbutyronitrile
 (thermal initiator; compn. for protecting anode
 for lithium metal battery)

L101 ANSWER 2 OF 21 HCA COPYRIGHT 2007 ACS on STN
 AN 142:117693 HCA Full-text
 TI Method of fabrication of anode for rechargeable lithium battery
 IN Cho, Chung-Kun; Hwang, Duck-Chul; Hwang, Seung-Sik; Lee, Sang-Mock
 PA Samsung SDI Co., Ltd., S. Korea
 SO U.S. Pat. Appl. Publ., 11 pp.
 CODEN: USXXCO
 DT Patent
 LA English
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2005008938	A1	20050113	US 2004-778319	
			200402	
			17	
		<--		
KR 2005007484	A	20050119	KR 2003-46160	
			200307	
			08	
CN 1577919	A	20050209	CN 2004-10047712	
			200403	
			05	
		<--		
JP 2005044796	A	20050217	JP 2004-200674	
			200407	
			07	
		<--		
PRAI KR 2003-46160	A	20030708	<--	

AB A neg. electrode of a rechargeable lithium battery includes a current collector, a neg. active material layer on one side of the current collector, a protection layer on the neg. active material and a releasing layer on the other side of the current collector, or on the protection layer.
 IT 26134-62-3, Lithium nitride
 (method of fabrication of anode for rechargeable lithium battery)
 RN 26134-62-3 HCA
 CN Lithium nitride (Li3N) (CA INDEX NAME)



IC ICM H01M002-16
 ICS H01M002-18
 INCL 429246000; 429144000; 429249000
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 IT Secondary batteries
 (lithium, Li-S; method of
 fabrication of anode for rechargeable lithium battery)
 IT 554-13-2, Lithium carbonate 7429-90-5, Aluminum, uses 7439-89-6,

Iron, uses 7439-92-1, Lead, uses 7439-93-2, Lithium, uses 7439-95-4, Magnesium, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-09-7, Potassium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-23-5, Sodium, uses 7440-24-6, Strontium, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-39-3, Barium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-56-4, Germanium, uses 7440-57-5, Gold, uses 7440-66-6, Zinc, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses 10377-52-3, Lithium phosphate 10544-50-0, Sulfur s8, uses 12627-14-4, Lithium silicate 12676-27-6 26134-62-3, Lithium nitride 37220-89-6, Lithium aluminate 39302-37-9, Lithium titanium oxide 152747-89-2, Lanthanum lithium oxide 184905-46-2, Lithium nitrogen phosphorus oxide 188596-59-0, Syl-off 7922 236388-73-1, Lithium silicide sulfide 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum lithium sulfide 236388-76-4, Lithium phosphide sulfide 342379-43-5, Germanium lithium sulfide (method of fabrication of anode for rechargeable lithium battery)

L101 ANSWER 3 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 142:25936 HCA [Full-text](#)

TI Alleviation of voltage delay in lithium-liquid depolarizer/electrolyte solvent battery cells

IN De Jonghe, Lutgard; Nimon, Yevgeniy S.; Visco, Steven J.

PA Polyplus Battery Company, USA

SO U.S. Pat. Appl. Publ., 12 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	
PI	US 2004248009	A1	20041209	US 2003-455259	
				200306	
				04	
WO	2004109826	A2	20041216	WO 2004-US18173	
				200406	
				03	
			<--		
WO	2004109826	A3	20050224		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP	1629555	A2	20060301	EP 2004-754704	
				200406	

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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK

PRAI US 2003-455259 A 20030604 <--

WO 2004-US18173 W 20040603

AB Voltage delay in an active metal anode/liq. cathode battery cell can be significantly reduced or completely alleviated by coating the active metal anode (e.g., Li) surface with a thin layer of an inorg. compd. with Li-ion cond. using chem. treatment of Li surface. Particularly, preferred examples of such compds. include lithium phosphate, lithium metaphosphate, and/or their mixts. or solid solns. with lithium sulfate. These compds. can be formed on the Li surface by treatment with dild. solns. of the following individual acids: H₃PO₄, HPO₃ and H₂SO₄, their acidic salts, or their binary or ternary mixts. in a dry org. solvent compatible with Li, for instance in 1,2-DME; by various deposition techniques. Such chem. protection of the Li or other active metal electrode significantly reduces the voltage delay due to protected anode's improved stability toward the electrolyte.

IT 7439-93-2, Lithium, uses 14024-11-4, Lithium tetrachloroaluminate

(alleviation of voltage delay in lithium-liq. depolarizer/electrolyte solvent battery cells)

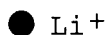
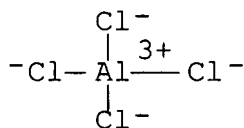
RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



IC ICM H01M004-58

ICS H01M006-00; H01M006-18; H01M010-00

INCL 429231600; 429231900; 429231950; 429321000; 429322000; 429323000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

IT Battery anodes

Battery electrolytes

Coating materials

Primary batteries

Surface impedance

(alleviation of voltage delay in lithium-liq. depolarizer/electrolyte solvent battery cells)

IT 7439-93-2, Lithium, uses 7439-95-4, Magnesium, uses

7440-09-7, Potassium, uses 7440-17-7, Rubidium, uses 7440-23-5,

Sodium, uses 7440-41-7, Beryllium, uses 7440-70-2, Calcium, uses 7446-09-5, Sulfur dioxide, uses 7446-11-9, Sulfur trioxide, uses 7446-70-0, Aluminum chloride (AlCl₃), uses 7719-09-7, Thionyl chloride 7727-18-6, Vanadium oxytrichloride 7791-23-3, Selenium oxychloride seocl₂ 7791-25-5, Sulfuryl chloride 10025-67-9, Sulfur monochloride 10025-87-3, Phosphoric trichloride 10102-44-0, Nitrogen dioxide, uses 13444-90-1, Nitryl chloride 14024-11-4, Lithium tetrachloroaluminate 14977-61-8, Chromyl chloride 74140-67-3, Sulfur monobromide (alleviation of voltage delay in lithium-liq. depolarizer/electrolyte solvent battery cells)

L101 ANSWER 4 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 141:368410 HCA Full-text

TI Method of preparation of anode for lithium battery

IN Lee, Jong-Ki; Lee, Jea-Woan; Cho, Chung-Kun; Lee, Sang-Mock

PA Samsung SDI Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 8 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2004209159	A1	20041021	US 2004-820762	20040409
		<--		
KR 2004090561	A	20041026	KR 2003-24427	20030417
JP 2004319489	A	20041111	JP 2004-116658	20040412
		<--		
CN 1571187	A	20050126	CN 2004-10071491	20040417
		<--		

PRAI KR 2003-24427 A 20030417 <--

AB A neg. electrode of a lithium battery includes a lithium metal and a protective layer that includes a material having an ion cond. of at least 5×10^{-5} S/cm. The protective layer includes ion conductive material that has a dense internal structure and an effective adhesive strength to the lithium metal. Although the protective layer has a thickness in the order of micrometers, the protective layer does not cause resistance to the electrochem. reaction and is chem. stable with respect to both the lithium metal and the electrolyte.

IT 7439-93-2, Lithium, uses

(method of prepn. of anode for lithium battery)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

IT 12015-64-4, Lithium chloride nitride (Li9Cl3N2)
 14024-11-4, Lithium tetrachloroaluminate 26134-62-3
 , Lithium nitride (Li3N) 73071-42-8, Lithium iodide
 nitride (LiI0IN3) 778589-21-2, Lithium sodium chloride
 nitride ((Li,Na)9Cl3N2) 778589-22-3, Lithium potassium
 chloride nitride ((Li,K)9Cl3N2) 778589-23-4, Lithium
 rubidium chloride nitride ((Li,Rb)9Cl3N2) 778589-24-5,
 Cesium lithium chloride nitride ((Cs,Li)9Cl3N2) 778589-25-6
 , Lithium sodium iodide nitride (Li9NaIN3) 778589-26-7,
 Lithium potassium iodide nitride (Li9KIN3) 778589-27-8,
 Lithium rubidium iodide nitride (Li9RbIN3)
 (protective layer; method of prepn. of
 anode for lithium battery)

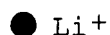
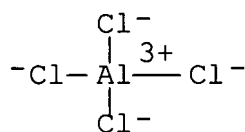
RN 12015-64-4 HCA

CN Lithium chloride nitride (Li9Cl3N2) (7Cl, 8Cl, 9Cl) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
Cl	3	22537-15-1
N	2	17778-88-0
Li	9	7439-93-2

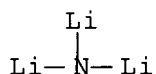
RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



RN 26134-62-3 HCA

CN Lithium nitride (Li3N) (CA INDEX NAME)



RN 73071-42-8 HCA

CN Lithium iodide nitride (LiI0IN3) (9Cl) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
N	3	17778-88-0
I	1	14362-44-8

Li | 10 | 7439-93-2

RN 778589-21-2 HCA

CN Lithium sodium chloride nitride ((Li,Na)9Cl3N2) (9Cl) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
Cl	3	22537-15-1
N	2	17778-88-0
Na	0 - 9	7440-23-5
Li	0 - 9	7439-93-2

RN 778589-22-3 HCA

CN Lithium potassium chloride nitride ((Li,K)9Cl3N2) (9Cl) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
Cl	3	22537-15-1
N	2	17778-88-0
K	0 - 9	7440-09-7
Li	0 - 9	7439-93-2

RN 778589-23-4 HCA

CN Lithium rubidium chloride nitride ((Li,Rb)9Cl3N2) (9Cl) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
Cl	3	22537-15-1
N	2	17778-88-0
Rb	0 - 9	7440-17-7
Li	0 - 9	7439-93-2

RN 778589-24-5 HCA

CN Cesium lithium chloride nitride ((Cs,Li)9Cl3N2) (9Cl) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
Cl	3	22537-15-1
N	2	17778-88-0
Cs	0 - 9	7440-46-2
Li	0 - 9	7439-93-2

RN 778589-25-6 HCA

CN Lithium sodium iodide nitride (Li9NaIN3) (9Cl) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	

N		3		17778-88-0
I		1		14362-44-8
Na		1		7440-23-5
Li		9		7439-93-2

RN 778589-26-7 HCA

CN Lithium potassium iodide nitride (Li9KIN3) (9CI) (CA INDEX NAME)

Component		Ratio		Component
		Registry Number		
N		3		17778-88-0
I		1		14362-44-8
K		1		7440-09-7
Li		9		7439-93-2

RN 778589-27-8 HCA

CN Lithium rubidium iodide nitride (Li9RbIN3) (9CI) (CA INDEX NAME)

Component		Ratio		Component
		Registry Number		
N		3		17778-88-0
I		1		14362-44-8
Rb		1		7440-17-7
Li		9		7439-93-2

IC ICM H01M002-16

ICS H01M004-40; B05D005-12

INCL 429137000; X42-924.6; X42-923.195; X42-712.3

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST anode prepn lithium battery

IT Vapor deposition process

(chem., laser-assisted; method of prepn. of anode for lithium battery)

IT Vapor deposition process

(chem.; method of prepn. of anode for lithium battery)

IT Secondary batteries

(lithium, Li-S; method of prepn. of anode for lithium battery)

IT Battery anodes

Electron beam evaporation

Ion beam sputtering

Ionic conductivity

Laser ablation

Sputtering

(method of prepn. of anode for lithium battery)

IT Polyesters, uses

(method of prepn. of anode for lithium battery)

IT Vapor deposition process

(plasma; method of prepn. of anode for lithium battery)

IT Nitrides

Oxides (inorganic), uses

Oxynitrides

Sulfides, uses

(protective layer; method of prepn. of

anode for lithium battery)

IT Evaporation
(vacuum thermal; method of prepn. of anode for lithium battery)

IT Jets
(vapor, deposition; method of prepn. of anode for lithium battery)

IT 7439-93-2, Lithium, uses
(method of prepn. of anode for lithium battery)

IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses
7446-09-5, Sulfur dioxide, uses 7727-37-9, Nitrogen, uses
7782-44-7, Oxygen, uses 7782-50-5, Chlorine, uses 25038-59-9,
uses
(method of prepn. of anode for lithium battery)

IT 12015-64-4, Lithium chloride nitride (Li9Cl3N2)
14024-11-4, Lithium tetrachloroaluminate 26134-62-3
, Lithium nitride (Li3N) 73071-42-8, Lithium iodide
nitride (Li10IN3) 778589-21-2, Lithium sodium chloride
nitride ((Li,Na)9Cl3N2) 778589-22-3, Lithium potassium
chloride nitride ((Li,K)9Cl3N2) 778589-23-4, Lithium
rubidium chloride nitride ((Li,Rb)9Cl3N2) 778589-24-5,
Cesium lithium chloride nitride ((Cs,Li)9Cl3N2) 778589-25-6
, Lithium sodium iodide nitride (Li9NaIN3) 778589-26-7,
Lithium potassium iodide nitride (Li9KIN3) 778589-27-8,
Lithium rubidium iodide nitride (Li9RbIN3)
(protective layer; method of prepn. of
anode for lithium battery)

L101 ANSWER 5 OF 21 HCA COPYRIGHT 2007 ACS on STN
AN 141:126371 HCA Full-text

TI Ionically conductive composites for protection of active metal
anodes in batteries

IN Visco, Steven J.; Nimon, Yevgeniy S.; Katz, Bruce D.

PA Polyplus Battery Company, USA

SO U.S. Pat. Appl. Publ., 23 pp., Cont.-in-part of U.S. Ser. No.
686,189.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 5

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2004142244	A1	20040722	US 2003-731771	
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US 2004126653	A1	20040701	US 2003-686189	
			200310	
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US 2004191617	A1	20040930	US 2004-772228	
			200402	
			03	
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US 2004197641	A1	20041007	US 2004-772157	

200402
03

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WO 2005038962 A2 20050428 WO 2004-US33372
200410
08

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WO 2005038962 A3 20051229

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CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP,
KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD,
SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,
AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL,
PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG

PRAI US 2002-418899P P 20021015 <--

US 2003-686189 A2 20031014 <--

US 2003-511710P P 20031014 <--

US 2003-518948P P 20031110 <--

US 2003-526662P P 20031202 <--

US 2003-527098P P 20031203 <--

US 2003-731771 A2 20031205 <--

US 2004-536688P P 20040114

US 2004-536689P P 20040114

US 2004-772228 A 20040203

AB Disclosed are ionically conductive composites for protection of active metal anodes and methods for their fabrication. The composites may be incorporated in active metal anode structures and battery cells. In accordance with the invention, the properties of different ionic conductors are combined in a composite material that has the desired properties of high overall ionic cond. and chem. stability towards the anode, the cathode and ambient conditions encountered in battery manufg. The composite is capable of protecting an active metal anode from deleterious reaction with other battery components or ambient conditions while providing a high level of ionic cond. to facilitate manuf. and/or enhance performance of a battery cell in which the composite is incorporated.

IT 7439-93-2, Lithium, uses
(ionically conductive composites for protection of active metal
anodes in batteries)

RN 7439-93-2 HCA

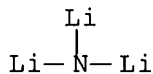
CN Lithium (CA INDEX NAME)

Li

IT 26134-62-3, Lithium nitride (Li3N)
(ionically conductive composites for protection of active metal
anodes in batteries)

RN 26134-62-3 HCA

CN Lithium nitride (Li3N) (CA INDEX NAME)



- IC ICM H01M002-16
- INCL 429246000; 429320000; 429322000
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 - Section cross-reference(s): 57
- ST battery anode active metal protection ionically conductive composite
- IT Halides
 - Nitrides
 - (active metal; ionically conductive composites for protection of active metal anodes in batteries)
- IT Metals, uses
 - (active; ionically conductive composites for protection of active metal anodes in batteries)
- IT Battery anodes
 - Ceramics
 - Composites
 - Glass ceramics
 - Ionic conductivity**
 - Ionic conductors
 - (ionically conductive composites for protection of active metal anodes in batteries)
- IT Secondary batteries
 - (lithium; ionically conductive composites for protection of active metal anodes in batteries)
- IT Phosphate glasses
 - (oxynitride, active metal; ionically conductive composites for protection of active metal anodes in batteries)
- IT Glass, uses
 - (oxynitride, phosphorus oxynitride, active metal; ionically conductive composites for protection of active metal anodes in batteries)
- IT Group VA element compounds
 - (phosphides, active metal; ionically conductive composites for protection of active metal anodes in batteries)
- IT Sputtering
 - (radio-frequency; ionically conductive composites for protection of active metal anodes in batteries)
- IT Lithium alloy, base
 - (ionically conductive composites for protection of active metal anodes in batteries)
- IT 1310-53-8, Germanium, uses 1314-23-4, Zirconia, uses 1314-56-3, Phosphorus oxide (P2O5), uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 12024-21-4, Gallium oxide (Ga2O3) 12057-24-8, Lithium oxide (Li2O), uses 13463-67-7, Titania, uses (glass ceramic; ionically conductive composites for protection of active metal anodes in batteries)
- IT 7439-93-2, Lithium, uses
 - (ionically conductive composites for protection of active metal anodes in batteries)

IT 1308-80-1, Copper nitride Cu_3N 7440-50-8, Copper, uses
 7447-41-8, Lithium chloride (LiCl), uses 7550-35-8, Lithium
 bromide 7789-24-4, Lithium fluoride, uses 10377-51-2, Lithium
 iodide 10377-52-3 12024-22-5, Gallium sulfide Ga_2S_3
 12025-34-2, Germanium sulfide GeS_2 12057-29-3, Lithium phosphide
 Li_3P 12136-58-2, Lithium sulfide (Li_2S) 13759-10-9, Silicon
 sulfide SiS_2 26134-62-3, Lithium nitride (Li_3N)
 70780-99-3, Silicon 77641-62-4, Nasicon 184905-46-2, Lithium
 nitrogen phosphorus oxide
 (ionically conductive composites for protection of active metal
 anodes in batteries)

IT 11138-49-1, Sodium β -alumina 37220-89-6, Lithium
 β -alumina
 (of β -alumina type; ionically conductive composites for
 protection of active metal anodes in batteries)

L101 ANSWER 6 OF 21 HCA COPYRIGHT 2007 ACS on STN
 AN 141:126310 HCA [Full-text](#)
 TI Solid secondary lithium batteries showing high charge-discharge
 current density
 IN Kondo, Shigeo; Kurisu, Yasuyuki; Kageyama, Hiroyuki; Takeuchi,
 Tomonari; Kanno, Ryoji; Inada, Taro
 PA Ion Engineering Center Corp., Japan; National Institute of Advanced
 Industrial Science and Technology
 SO Jpn. Kokai Tokkyo Koho, 12 pp.
 CODEN: JKXXAF

DT Patent
 LA Japanese
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004206942	A	20040722	JP 2002-372272	20021224

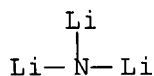
PRAI JP 2002-372272 20021224 <--

AB In the batteries, solid electrolytes comprise first low-ionic-cond. layers reactive to Li, and second layers unreactive to the first layers and preformed on surfaces of Li metal anodes. Preferably, the first layers comprise cryst. and/or amorphous Li ion conductive sulfides, and the second layers comprise Li ion conductive thin films chosen from Li_3N , LiI , LiF , SOCl_2 -Li reaction product, Li sulfite, and LiPF_6 .

IT 7439-93-2DP, Lithium, reaction product with thionyl chloride
 26134-62-3P, Lithium nitride
 (second solid electrolyte layer; solid secondary lithium
 batteries using solid electrolytes comprising first
 low-ionic-cond. layers reactive to Li and second layers
 unreactive to the first layers)

RN 7439-93-2 HCA
 CN Lithium (CA INDEX NAME)

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IC ICM H01M010-36
ICS H01M004-02; H01M004-40; H01M004-62
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT 7439-93-2DP, Lithium, reaction product with thionyl chloride
7719-09-7DP, Thionyl chloride, reaction product with lithium
7789-24-4P, Lithium fluoride, uses 10377-51-2P, Lithium iodide
13308-35-5P 26134-62-3P, Lithium nitride
(second solid electrolyte layer; solid secondary lithium
batteries using solid electrolytes comprising first
low-ionic-cond. layers reactive to Li and second layers
unreactive to the first layers)

L101 ANSWER 7 OF 21 HCA COPYRIGHT 2007 ACS on STN
AN 141:9653 HCA [Full-text](#)
TI Negative electrode having lithium ion conductive
inorganic compound layer, lithium secondary battery with improved
cycle characteristic, and manufacture thereof
IN Konishiike, Isamu; Yasuda, Toshikazu; Kubota, Tadahiko
PA Sony Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 18 pp.
CODEN: JKXXAF

DT Patent
LA Japanese
FAN.CNT 1

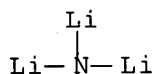
	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	JP 2004165097	A	20040610	JP 2002-332421	
				200211	
				15	

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PRAI JP 2002-332421 20021115 <--

AB Disclosed is the neg. electrode comprising a neg. electrode current collector, a metal Li layer formed on the current collector using a dry film forming method, and an inorg. compd. layer on the metal Li layer which has a Li+ cond. $\geq 1 + 10^{-8}$ S/cm at room temp. and is formed in vacuum ≤ 10 Pa using a dry film forming method. The use of the inorg. compd. layer prevented an increase of the internal impedance.

IT 26134-62-3, Lithium nitride
(neg. electrode having lithium ion conductive
inorg. compd. layer in lithium secondary battery with improved
cycle characteristic)

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IC ICM H01M004-02
 ICS H01M004-40; H01M004-64; H01M004-66; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST neg electrode lithium ion secondary battery
 inorg compd layer
 IT Secondary batteries
 (lithium; neg. electrode having lithium ion
 conductive inorg. compd. layer in lithium secondary battery with
 improved cycle characteristic)
 IT Battery electrodes
 (neg. electrode having lithium ion conductive
 inorg. compd. layer in lithium secondary battery with improved
 cycle characteristic)
 IT 554-13-2, Lithium carbonate 7439-98-7, Molybdenum, uses
 7440-02-0, Nickel, uses 7440-25-7, Tantalum, uses 7440-32-6,
 Titanium, uses 7440-50-8, Copper, uses 7447-41-8, Lithium
 chloride, uses 7550-35-8, Lithium bromide 7789-24-4, Lithium
 fluoride, uses 10102-24-6, Lithium silicate 10377-48-7, Lithium
 sulfate 10377-51-2, Lithium iodide 10377-52-3, Lithium phosphate
 12057-24-8, Lithium oxide, uses 12136-58-2, Lithium sulfide
 26134-62-3, Lithium nitride 138709-72-5, Lithium phosphide
 (neg. electrode having lithium ion conductive
 inorg. compd. layer in lithium secondary battery with improved
 cycle characteristic)

L101 ANSWER 8 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 140:360340 HCA Full-text

TI Ionically conductive composites for protection of active metal
 anodes of batteries

IN Visco, Steven, Jr.; Nimon, Yevgeniy S.; Katz, Bruce D.

PA Polyplus Battery Company, USA

SO PCT Int. Appl., 47 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 5

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004036669	A2	20040429	WO 2003-US33457	

200310

14

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WO 2004036669 A3 20050324

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 GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,
 KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX,
 MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG,
 SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN,
 YU, ZA, ZM, ZW

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EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG

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CN 1726608 A 20060125 CN 2003-80106146
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MX 2005PA03971 A 20051005 MX 2005-PA3971
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PRAI US 2002-418899P P 20021015 <--
WO 2003-US33457 W 20031014 <--

AB Disclosed are ionically conductive composites for protection of active metal anodes and methods for their fabrication. The composites may be incorporated in active metal anode structures and battery cells. In accordance with the invention, the properties of different ionic conductors are combined in a composite material that has the desired properties of high overall ionic cond. and chem. stability towards the anode, the cathode and ambient conditions encountered in battery manufg. The composite is capable of protecting an active metal anode from deleterious reaction with other battery components or ambient conditions while providing a high level of ionic cond. to facilitate manuf. and/or enhance performance of a battery cell in which the composite is incorporated.

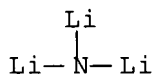
IT 7439-93-2, Lithium, uses 26134-62-3, Lithium
nitride (Li3N)
(ionically conductive composites for protection of active metal
anodes of batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)



IC ICM H01M004-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery active metal anode protection ionically conductive composite

IT Glass, uses

(P-based; ionically conductive composites for protection of active metal anodes of batteries)

IT Halides

(active metal halides; ionically conductive composites for protection of active metal anodes of batteries)

IT Nitrides

(active metal nitrides; ionically conductive composites for protection of active metal anodes of batteries)

IT Glass, uses

(active metal phosphorus oxynitride; ionically conductive composites for protection of active metal anodes of batteries)

IT Selenides

(glass; ionically conductive composites for protection of active metal anodes of batteries)

IT Battery anodes

Composites

Glass ceramics

Ionic conductivity

(ionically conductive composites for protection of active metal anodes of batteries)

IT Alkali metals, uses

Alkaline earth metals

Sulfide glasses

Transition metals, uses

(ionically conductive composites for protection of active metal anodes of batteries)

IT Group VA element compounds

(phosphides, active metal phosphides; ionically conductive composites for protection of active metal anodes of batteries)

IT Glass, uses

(selenide; ionically conductive composites for protection of active metal anodes of batteries)

IT Lithium alloy, base

(ionically conductive composites for protection of active metal anodes of batteries)

IT 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses

(glass; ionically conductive composites for protection of active metal anodes of batteries)

- IT 1308-80-1, Copper nitride Cu_3N 1310-53-8, Germanium oxide (GeO_2), uses 1313-49-1, Zinc nitride Zn_3N_2 1314-23-4, Zirconia, uses 1314-56-3, Phosphorus oxide (P_2O_5), uses 7439-93-2, Lithium, uses 7447-41-8, Lithium chloride (LiCl), uses 7550-35-8, Lithium bromide (LiBr) 7553-56-2, Iodine, uses 7631-86-9, Silica, uses 7723-14-0, Phosphorus, uses 7726-95-6, Bromine, uses 7782-41-4, Fluorine, uses 7782-50-5, Chlorine, uses 7789-24-4, Lithium fluoride, uses 10377-51-2, Lithium iodide (LiI) 10377-52-3, Trilithium phosphate 12024-22-5, Gallium sulfide Ga_2S_3 12025-34-2, Germanium sulfide GeS_2 12033-89-5, Silicon nitride, uses 12057-29-3, Lithium phosphide Li_3P 12136-58-2, Dilithium sulfide 13463-67-7, Titania, uses 13759-10-9, Silicon sulfide SiS_2 24304-00-5, Aluminum nitride AlN 25014-15-7, Poly(2-vinylpyridine) 26134-62-3, Lithium nitride (Li_3N) 37245-77-5, Iron nitride 55326-68-6, Cobalt nitride 55574-97-5, Tin nitride 70780-99-3, Lisicon 77641-62-4, Nasicon 203402-92-0, Lithium nitride phosphate (ionically conductive composites for protection of active metal anodes of batteries)
- IT 11138-49-1, Sodium β -alumina 37220-89-6, Lithium β -alumina (of β -alumina type; ionically conductive composites for protection of active metal anodes of batteries)

L101 ANSWER 9 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 139:103655 HCA [Full-text](#)

TI The electrochemistry of germanium nitride versus lithium

AU Pereira, N.; Balasubramanian, M.; Dupont, L.; McBreen, J.; Klein, L. C.; Amatucci, G. G.

CS Telcordia Technologies, Red Bank, NJ, 07701, USA

SO Materials Research Society Symposium Proceedings (2003),

756(Solid State Ionics--2002), 281-287

CODEN: MRSPDH; ISSN: 0272-9172

PB Materials Research Society

DT Journal

LA English

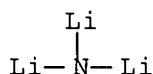
AB Germanium nitride (Ge_3N_4) was examd. as a potential neg. electrode material for Li-ion batteries. The electrochem. of Ge_3N_4 vs. Li showed high reversible capacity (500mAh/g) and good capacity retention during cycling. A combination of ex-situ and in-situ x-ray diffraction (XRD), ex-situ transmission electron microscopy (TEM) and ex-situ selective area electron diffraction (SAED) analyses revealed evidence supporting the conversion of a layer of Ge_3N_4 crystal into an amorphous $\text{Li}_3\text{N}+\text{Li}_x\text{Ge}$ nanocomposite during the first lithiation. The nanocomposite was electrochem. active via a reversible Li-Ge alloying reaction while a core of unreacted Ge_3N_4 crystal remained inactive. The lithium/metal nitride conversion reaction process was kinetically hindered resulting in limited capacity. Mech. milling was found to improve the material capacity.

IT 7439-93-2, Lithium, uses (electrochem. reaction with Ge_3N_4 in PC/GMC contg. LiPF_6)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

IT 26134-62-3, Lithium nitride
(formation by electrochem. lithiation of Ge₃N₄)
RN 26134-62-3 HCA
CN Lithium nitride (Li₃N) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 78

IT Battery electrodes
(Ge₃N₄ as potential neg. electrode material
for Li-ion batteries)
IT Electric capacitance
(of Ge₃N₄ as potential neg. electrode
material for Li-ion batteries, in PC/GMC contg. LiPF₆)
IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
21324-40-3, Lithium hexafluorophosphate
(elec. capacitance of Ge₃N₄ as potential neg.
electrode material for Li-ion batteries, in PC/GMC contg.
LiPF₆)
IT 7439-93-2, Lithium; uses
(electrochem. reaction with Ge₃N₄ in PC/GMC contg. LiPF₆)
IT 26134-62-3, Lithium nitride 54355-30-5
(formation by electrochem. lithiation of Ge₃N₄)
IT 12065-36-0, Germanium nitride Ge₃N₄
(potential neg. electrode material for Li-ion
batteries)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L101 ANSWER 10 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 131:162542 HCA [Full-text](#)

TI Common features of electrochemical kinetics of the lithium electrode
in different electrolyte systems

AU Churikov, A. V.; L'vov, A. L.; Gamayunova, I. M.; Shirokov, A. V.

CS Saratov State University, Saratov, 410601, Russia

SO Russian Journal of Electrochemistry (Translation of Elektrokimiya)
(1999), 35(7), 764-770

CODEN: RJELE3; ISSN: 1023-1935

PB MAIK Nauka/Interperiodica Publishing

DT Journal

LA English

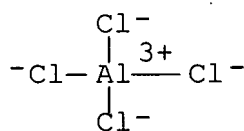
AB Techniques of the electrode impedance spectroscopy and pulsed voltammetry are employed to study the electrochem. behavior of the lithium electrode in a LiAlCl₄ soln. in thionyl chloride and in a LiBF₄ soln. in γ -butyrolactone. The behavior of similar electrode covered by a protective film of Li₂CO₃ is studied in the course of storing in a LiClO₄ soln. in the mixed solvent contg. propylene carbonate and dimethoxyethane. The results are compared with the data obtained earlier for other lithium electrochem. systems. Common regularities of the electrochem. kinetics of the lithium electrode, caused by the ion transfer in surface passivating films, are discussed.

IT 7439-93-2, Lithium; uses
(common features of electrochem. kinetics of lithium electrode in

different electrolyte systems)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IT 14024-11-4, Lithium aluminum chloride (LiAlCl₄)
(electrochem. behavior of lithium electrode in LiAlCl₄
soln. in thionyl chloride)
RN 14024-11-4 HCA
CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



● Li⁺

CC 72-2 (Electrochemistry)
Section cross-reference(s): 67
IT Electric impedance
(for Li in LiAlCl₄ soln. in thionyl chloride and in
LiBF₄ soln. in γ-butyrolactone)
IT Anodic polarization
(for Li in LiBF₄ soln. in γ-butyrolactone)
IT 7439-93-2, Lithium, uses
(common features of electrochem. kinetics of lithium electrode in
different electrolyte systems)
IT 7719-09-7, Thionyl chloride 14024-11-4, Lithium aluminum
chloride (LiAlCl₄)
(electrochem. behavior of lithium electrode in LiAlCl₄
soln. in thionyl chloride)
RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L101 ANSWER 11 OF 21 HCA COPYRIGHT 2007 ACS on STN
AN 119:99842 HCA [Full-text](#)
TI Active mine batteries with long shelf-life. 1. Development of
lithium-ion conducting polymeric anode films
AU Abraham, K. M.; Pasquariello, D. M.; Hart, M.; Kilroy, W. P.
CS EIC Labs. Inc., Norwood, MA, USA
SO Report (1991), NAVSWC-TR-91-20; Order No. AD-A245052, 58
pp. Avail.: NTIS
From: Gov. Rep. Announce. Index (U. S.) 1992, 92(9), Abstr. No.
222,879
DT Report

LA English

AB Despite the attractive features of Li/SOCl₂ batteries, e.g., high energy d., high load voltage, and wide operational temp. range, some important problems persist hindering the widespread application of the batteries. Notable among these problems is voltage delay, i.e., the initial drop of the cell voltage to <2 V, on load after prolonged storage, esp. at 70° followed by discharge at high rates and low temps. The delay is due to the Li anode instantaneously forming a protective film of LiCl on the surface when the anode comes in contact with the SOCl₂/LiAlCl₄ electrolyte. Although the reaction of Li and SOCl₂ is strongly favored by thermodyn., the formation of the LiCl film passivates the Li, kinetically hindering the reaction. Prolonged storage of the batteries leads to an increase in the thickness of the LiCl film.

IT 7439-93-2, Lithium, uses
(anodes, passivation of, in active mine thionyl
chloride batteries, storage effect on)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium anode passivation voltage delay; thionyl chloride
lithium battery performance storage

IT Passivation
(electrochem., of lithium anodes, in active mine
thionyl chloride batteries, storage effect on)

IT 7439-93-2, Lithium, uses
(anodes, passivation of, in active mine thionyl
chloride batteries, storage effect on)

IT 7447-41-8P, Lithium chloride, preparation
(film, formation of, on lithium anodes, in active mine
thionyl chloride batteries, storage effect on)

L101 ANSWER 12 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 118:237707 HCA [Full-text](#)

TI Secondary lithium batteries

IN Kanbara, Teruhisa; Sato, Yoshiko; Uemachi, Yasushi; Tonomura,
Tadashi; Takeyama, Kenichi

PA Matsushita Electric Industrial Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

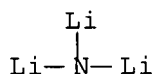
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 04267074	A	19920922	JP 1991-28404	19910222

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JP 3038945 B2 20000508
PRAI JP 1991-28404 19910222 <--

AB The batteries use cathodes comprising Li thiolates, contg. S-Li bonds and forming S-S bonds by electrolytic oxidn., and an ion- and electron-conductive polymer; Li ion-contg. or -conducting solid electrolytes; and Al (alloy)-carbonaceous material anodes. Preferably, the electrolytes contain polyamine adducts with ethylene oxide and/or propylene oxide, ion-exchanging layer compds., and LiX (X = strong acidic anion).

IT 26134-62-3, Lithium nitride
(electrolytes contg. lithium iodide and boron oxide and, for
secondary lithium batteries)
RN 26134-62-3 HCA
CN Lithium nitride (Li₃N) (CA INDEX NAME)



IC ICM H01M010-38
ICS H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76
IT 26134-62-3, Lithium nitride
(electrolytes contg. lithium iodide and boron oxide and, for
secondary lithium batteries)

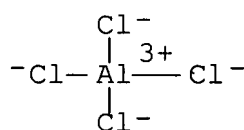
L101 ANSWER 13 OF 21 HCA COPYRIGHT 2007 ACS on STN
AN 107:118236 HCA [Full-text](#)
TI The application of microelectrodes to the study of the Li/Li⁺ couple
in LiAlCl₄/SOCl₂ electrolytes
AU Hedges, W. M.; Pletcher, D.; Gosden, C.
CS Dep. Chem., Univ. Southampton, SO9 5NH, UK
SO Proceedings of the International Power Sources Symposium (
1986), 32nd, 542-6
CODEN: PIPSEG

DT Journal
LA English
AB Li anodes (for high-energy batteries) in LiAlCl₄/SOCl₂ have high rate of deposition on Ni microelectrodes and corrosion even at low overpotential; the LiCl film (.apprx.2.5 nm) formed on the electrode surface allows for Li⁺ migration but prevents SOCl₂ oxidn. At neg. overpotentials, Li is cathodically protected but the surface is affected by SOCl₂ redn. and O reactions. A Li anode in SOCl₂ standing at open-circuit becomes covered with a thicker film than the LiCl film which causes voltage delays but the film dissolves on anodic polarization.

IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, deposition and corrosion of, in thionyl
chloride contg. electrolyte, surface layer in relation to)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IT 14024-11-4
(electrolytes contg. thionyl chloride and, lithium anode
surface behavior in, battery reaction in relation to)
RN 14024-11-4 HCA
CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium anode surface thionyl chloride; battery lithium anode surface electrolyte; nickel microelectrode lithium deposition corrosion

IT Oxidation, electrochemical
(of lithium, in thionyl chloride contg. electrolyte, battery anode surface behavior in relation to)

IT Anodes
(battery, lithium, surface behavior of, in lithium chloroaluminate-thionyl chloride electrolyte, deposition and corrosion in relation to)

IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, deposition and corrosion of, in thionyl chloride contg. electrolyte, surface layer in relation to)

IT 7719-09-7, Thionyl chloride
(electrolytes contg. lithium tetrachloroaluminate and, lithium anode surface behavior in, battery reaction in relation to)

IT 14024-11-4
(electrolytes contg. thionyl chloride and, lithium anode surface behavior in, battery reaction in relation to)

IT 7447-41-8P, Lithium chloride, preparation
(formation of, on nickel electrodes, in thionyl chloride contg. electrolyte, lithium anode surface behavior in relation to)

IT 7440-02-0, Nickel, uses and miscellaneous
(microelectrodes, lithium anode deposition and corrosion at, in thionyl chloride contg. electrolytes)

L101 ANSWER 14 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 104:12211 HCA [Full-text](#)

TI Formation of lithium nitride thin film by nitriding the surface of lithium metal and its application to batteries

AU Yamamoto, Takanori; Kikkawa, Shinichi; Koizumi, Mitsue

CS Inst. Sci. Ind. Res., Osaka Univ., Ibaraki, 567, Japan

SO Yogyo Kyokaishi (1985), 93(11), 728-31

CODEN: YGKSA4; ISSN: 0372-7718

DT Journal

LA Japanese

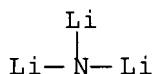
AB Formation of Li₃N thin film was studied by nitriding the surface of Li metal. The reaction process and the effects of atm. purity on the reaction were studied. The films having thickness of .apprx.1 mm were obtained at room temp. after a time of 90 min. The growth of the film decreased with increasing purity of N gas. The discharging current of 1 μA could be attained for >1 h in the Li/TiS₂ battery using the Li₃N film as electrolyte. The internal resistance of the cell was relatively

high and the long-term discharging was not possible. The reason for the high resistance is discussed in relation to the Li ionic conductivities measured on the compacted and the sintered bodies of Li3N.

IT 7439-93-2, uses and miscellaneous
(anode, in battery with titanium sulfide and lithium
nitride film electrolyte)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IT 26134-62-3P
(formation and elec. cond. and use as electrolyte in
lithium-titanium disulfide battery)
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



CC 72-3 (Electrochemistry)
Section cross-reference(s): 52, 76, 78
IT Electric conductivity and conduction
(ionic, of lithium nitride)
IT 7439-93-2, uses and miscellaneous
(anode, in battery with titanium sulfide and lithium
nitride film electrolyte)
IT 26134-62-3P
(formation and elec. cond. and use as electrolyte in
lithium-titanium disulfide battery)

L101 ANSWER 15 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 102:122047 HCA [Full-text](#)

TI Anode for a solid electrolyte battery

PA Hitachi Maxell, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 3 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 59173953	A	19841002	JP 1983-46726	
			198303	
			19	

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JP 05046058	B	19930712		
PRAI JP 1983-46726		19830319	<--	

AB The fabrication of an anode for a solid-electrolyte battery involves the following steps: (1) mixing liq. NH3 contg. Li with conductive powders other than Li and with solid-electrolyte powders; and (2) removing NH3 from the mixt. Thus, an anode for a Li-PbI2 battery was prepd. by mixing liq. NH3 contg. Li with 0.88 Li3N-0.12LiI (mixt. of Li3N and Li7N2I) powders and carbonyl Ni powders, and removing NH3 from the mixt. The battery showed improved discharge properties.

IT 7439-93-2, uses and miscellaneous
(anodes, for solid-electrolyte battery, liq. ammonia treatment for)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IT 12030-04-5

(liq. ammonia treatment of lithium and metal powders and solid electrolyte contg., for anode for solid-electrolyte battery)

RN 12030-04-5 HCA

CN Lithium iodide nitride (Li7IN2) (7CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
N	2	17778-88-0
I	1	14362-44-8
Li	7	7439-93-2

IC H01M004-12; B21D028-14

ICA B26F001-16

CC 72-3 (Electrochemistry)

ST lithium anode solid electrolyte battery; lead iodide lithium battery anode; ammonia liq treatment battery anode

IT Anodes

(battery, solid-electrolyte, lithium, liq. ammonia treatment for)

IT 7439-93-2, uses and miscellaneous

(anodes, for solid-electrolyte battery, liq. ammonia treatment for)

IT 1310-65-2 1344-28-1, uses and miscellaneous 7550-35-8

(liq. ammonia treatment of lithium and conductive metal powders and solid electrolyte powders contg., for anode for solid-electrolyte battery)

IT 10377-51-2 12030-04-5 26134-62-3

(liq. ammonia treatment of lithium and metal powders and solid electrolyte contg., for anode for solid-electrolyte battery)

IT 7429-90-5, uses and miscellaneous 7439-89-6, uses and miscellaneous 7439-92-1, uses and miscellaneous 7439-96-5, uses and miscellaneous 7440-02-0, uses and miscellaneous 7440-22-4, uses and miscellaneous 7440-33-7, uses and miscellaneous 7440-36-0, uses and miscellaneous 7440-38-2, uses and miscellaneous 7440-43-9, uses and miscellaneous 7440-48-4, uses and miscellaneous 7440-50-8, uses and miscellaneous 7440-57-5, uses and miscellaneous 7440-69-9, uses and miscellaneous

12597-68-1, uses and miscellaneous
(liq. ammonia treatment of lithium and solid electrolyte powders
and conductive powders of, for anode for
solid-electrolyte battery)

IT 7664-41-7, uses and miscellaneous
(liq., in treatment of lithium and metal
powders and solid electrolyte, for anode for
solid-electrolyte battery)

L101 ANSWER 16 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 101:200128 HCA [Full-text](#)

TI Solid electrolyte batteries using lithium nitride-lithium iodide
(Li₃N-LiI)

AU Nagai, Ryo; Wada, Shuichi; Kawakami, Akira

CS Tech. Res. Cent., Hitachi Maxell, Ltd., Ibaraki, 567, Japan

SO Progress in Batteries & Solar Cells (1984), 5, 69-72

CODEN: PBASDR; ISSN: 0198-7259

DT Journal

LA English

AB A battery is described having a cathode mix composed of PbI₂ and carbonyl Ni, a solid electrolyte composed of Li₃N-LiI (0.88/0.12 molar ratio) also contg. carbonyl Ni and a Li powder anode. A high current is achieved by using a mixt. of Li powder and Li₃N-LiI solid electrolyte for the anode. The addn. of carbonyl Ni to this anode mix increases the discharge efficiency of Li.

IT 7439-93-2, uses and miscellaneous
(battery, with lead iodide cathode and lithium iodide-lithium
nitride solid electrolyte, effect of carbonyl nickel on)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IT 12030-04-5P

(formation of, in lithium nitride-lithium iodide solid
electrolyte with lithium-lead iodide battery)

RN 12030-04-5 HCA

CN Lithium iodide nitride (Li₇IN₂) (7CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component
	Registry Number	
N	2	17778-88-0
I	1	14362-44-8
Li	7	7439-93-2

CC 72-3 (Electrochemistry)

IT Anodes

(battery, lithium, effect of carbonyl nickel on)

IT 7439-93-2, uses and miscellaneous
(battery, with lead iodide cathode and lithium iodide-lithium
nitride solid electrolyte, effect of carbonyl nickel on)

IT 12030-04-5P

(formation of, in lithium nitride-lithium iodide solid
electrolyte with lithium-lead iodide battery)

L101 ANSWER 17 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 95:194349 HCA [Full-text](#)

TI The behavior of the lithium/lithium nitride interface under
anodic polarization

AU Von Alpen, U.; Bell, M. F.

CS VARTA Batterie A.-G., Kelkheim, D-6233, Fed. Rep. Ger.

SO Solid State Ionics (1981), 3-4, 259-62

CODEN: SSIOD3; ISSN: 0167-2738

DT Journal

LA English

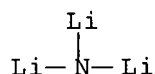
AB The kinetics of Li transport across the interface formed by melting Li onto a Li₃N sinter was studied using a linear potential sweep technique. A mode, which allows the calcn. of the product of concn. and diffusion coeff. to be calcd. is proposed to account for the obsd. behavior. In this model, it is suggested that the 2nd mobile species, required for electroneutrality, is H introduced into the samples during prepn. IR absorption measurements carried out on a Li₃N single crystal during polarization between Li electrodes show that both Li ions and H ions are mobile.

IT 26134-62-3

(anodic polarization of lithium at interface with,
lithium transport in relation to)

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)



IT 7439-93-2, properties

(anodic polarization of lithium nitride interface with,
lithium transport in relation to)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)



CC 72-7 (Electrochemistry)

Section cross-reference(s): 76

ST anodic polarization lithium nitride interface; cond ionic
lithium nitride

IT Electrolytic polarization

(anodic, at lithium-lithium nitride interface, lithium
transport in relation to)

IT Electric conductivity and conduction

(ionic, of lithium nitride, hydrogen doping effect on)

IT 26134-62-3

(anodic polarization of lithium at interface with,
lithium transport in relation to)

IT 7439-93-2, properties

(anodic polarization of lithium nitride interface with,
lithium transport in relation to)

IT 1333-74-0, properties

(elec. cond. of lithium nitride crystals
doped with)

L101 ANSWER 18 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 95:9874 HCA Full-text

TI Exothermic reactions among components of lithium-sulfur dioxide and
lithium-thionyl chloride cells

AU Dallek, S.; James, S. D.; Kilroy, W. P.

CS White Oak Lab., Nav. Surface Weapons Cent., Silver Spring, MD,
20910, USA

SO Journal of the Electrochemical Society (1981), 128(3),
508-16

CODEN: JESQAN; ISSN: 0013-4651

DT Journal

LA English

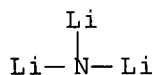
AB Differential scanning calorimetry measurements were made on various components of Li-SO₂ and Li-SOCl₂ cells to identify those combinations that react exothermically and might cause batteries to explode. The passivation of Li by SO₂ in MeCN [75-05-8] was characterized over a wide range of SO₂ concn. (0.1-14M). In the absence of SO₂, trace addns. of water greatly lower the exothermicity of the Li-MeCN reaction. The Li-SOCl₂-LiAlCl₄ mixt. is inert over a wide range of temp. well above the m.p. of Li. However, adding carbon black converts this inert mixt. into one which is highly and consistently reactive. The addn. of Cu powder enhances carbon black's catalytic effect on the reactivity of the Li-SOCl₂-LiAlCl₄ mixt. while trace addns. of H₂O have the opposite effect.

IT 26134-62-3

(reactivity of lithium in sulfur dioxide and thionyl chloride
systems contg.)

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 69

ST lithium battery exothermic reaction safety; sulfur dioxide
lithium battery; thionyl chloride lithium battery

IT Batteries, primary
(lithium-sulfur dioxide and lithium
thionyl chloride, exothermic reactions among components of)

IT Safety
(of lithium-sulfur dioxide and lithium
-thionyl chloride batteries, exothermic reactions of
battery components and)

IT 10025-67-9 10377-48-7 26134-62-3
(reactivity of lithium in sulfur dioxide and thionyl chloride
systems contg.)

L101 ANSWER 19 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 93:157695 HCA Full-text

TI Mechanism of passivation of lithium in thionyl chloride

AU Povarov, Yu. M.; Beketaeva, L. A.

CS Inst. Elektrokhim., Moscow, USSR

SO Elektrokimiya (1980), 16(8), 1252-6

CODEN: ELKKAX; ISSN: 0424-8570

DT Journal

LA Russian

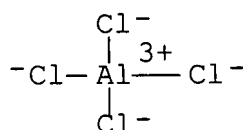
AB Electrochem. and photoelectrochem. methods were used to study the nature and properties of passivating films on Li in thionyl chloride (I) [7719-09-7]. A combination of these methods together with measurements of the temp. coeff. of resistance of the passivating film allows one to obtain definite information on the phenomenon of Li passivation. The mechanism of Li passivation in I consists of the formation on its surface of a cryst. semiconductive film, in which the basic current carriers are the Li⁺ cations.

IT 14024-11-4

(anodic polarization of lithium in soln. contg. thionyl chloride and)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



IT 7439-93-2, reactions

(passivation of, in thionyl chloride)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 72-4 (Electrochemistry)

ST passivation lithium thionyl chloride; anodic polarization
lithium thionyl chloride

IT Electrolytic polarization

(anodic, of lithium, in soln. contg. thionyl chloride
and lithium tetrachloroaluminate)

IT 14024-11-4

(anodic polarization of lithium in soln. contg. thionyl
chloride and)

IT 7439-93-2, reactions

(passivation of, in thionyl chloride)

L101 ANSWER 20 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 92:49357 HCA [Full-text](#)

TI The passivating layer on lithium in lithium tetrachloroaluminate-
thionyl chloride solutions

AU Peled, E.; Yamin, H.

CS Inst. Chem., Tel Aviv Univ., Tel Aviv, Israel

SO Proceedings of the Power Sources Symposium (1978), 28th,

237-41

CODEN: PSSYAD; ISSN: 0079-4457

DT Journal

LA English

AB The properties and growth rate of the passivating layer on Li in $\text{LiAlCl}_4\text{-SOCl}_2$ solns. were studied. A cylindrical glass cell was used and pulse galvanostatic measurements were made using either a galvanostat or a square-wave potential generator in series with a 1-15- Ω resistor. The Li electrode is always covered by a passivating film with a min. thickness in the case of freshly immersed electrodes or after anodic dissoln., a thickness of 20-40 Å. The spontaneous formation of LiCl crystals on oxide-covered Li was obsd. after 0.5 min of immersion in SOCl_2 . A mechanism of the growth of the passivating layer is given.

IT 7439-93-2, properties

(passivating layers on, in lithium tetrachloroaluminate-thionyl chloride solns.)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

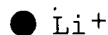
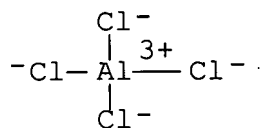
Li

IT 14024-11-4

(passivation by, of lithium, in thionyl chloride solns.)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 72-7 (Electrochemistry)

IT 7439-93-2, properties

(passivating layers on, in lithium tetrachloroaluminate-thionyl chloride solns.)

IT 14024-11-4

(passivation by, of lithium, in thionyl chloride solns.)

L101 ANSWER 21 OF 21 HCA COPYRIGHT 2007 ACS on STN

AN 91:201211 HCA [Full-text](#)

TI Stabilized glass-metal joints for lithium batteries

IN Taylor, Alwyn Henry

PA Mallory, P. R., and Co., Inc., USA

SO Belg., 14 pp.

CODEN: BEXXAL

DT Patent

LA French

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI BE 874052	A1	19790529	BE 1979-2057597	19790209
JP 54111634	A	19790901	JP 1979-4448	19790118
GB 2014354	A	19790822	GB 1979-2030	19790119
GB 2014354	B	19820714		
DE 2904396	A1	19790816	DE 1979-2904396	19790206
DE 2904396	C2	19880421		
CH 640084	A5	19831215	CH 1979-1139	19790206
NL 7900997	A	19790814	NL 1979-997	19790208
DK 7900559	A	19790811	DK 1979-559	19790209
NO 7900421	A	19790813	NO 1979-421	19790209
FR 2423062	A1	19791109	FR 1979-3373	19790209
FR 2423062	B1	19830909		
PRAI US 1978-876786	A	19780210		

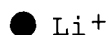
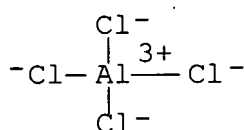
AB The casing of the battery is sealed with a cover consisting of a glass disk, perforated centrally and a circumferential metal ring, with a glass-metal seal and a metal-metal joint to the center casing. A metal tube fitted into the central orifice serves as a filling tube for the electrolyte and as pos. pole. To prevent degrdn. of the glass-metal joint in the cover, the cover is sepd. from the electrolyte and electrodes by a protective layer constituted by a metallic oxide with a free energy of formation greater than -418.5 kJ/g. atom O at 300 K with a polyolefin or polymeric fluorocarbon bonding agent. Thus a button-type battery with a Li anode and LiAlCl₄/SOCl₂ electrolyte is hermetically sealed with a borosilicate perforated glass disk bonded to a circumferential metal ring soldered to the surrounding casing. The Li anode is carried by the metal filling tube inserted through the cover orifice and directly below the glass disk with an intermediate protective layer consisting of polyethylene or polypropylene.

IT 7439-93-2, uses and miscellaneous
(battery, button-type, stabilized glass-metal joints in cover
for)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IT 14024-11-4
(lithium battery with electrolyte from thionyl chloride contg.,
stabilized glass-metal joints for cover for)
RN 14024-11-4 HCA
CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



IC H01M
CC 72-2 (Electrochemistry)
ST stabilized glass metal seal battery; cover metal glass joint
battery; aluminum protective layer cover
battery; calcium protective layer cover battery;
button lithium battery cover
IT Glass, oxide
(borosilicate, seal, with metal, stabilizer, for
lithium battery)
IT Seals (mechanical)
(glass-metal, in lithium button-type
batteries)
IT Batteries, primary
(button-type, lithium, stabilized glass-metal
joints in cover for)
IT 7439-93-2, uses and miscellaneous
(battery, button-type, stabilized glass-metal joints in cover
for)
IT 9002-88-4 9003-07-0
(in batteries, protective layer for metal
oxide and intermediate layer of, for cover of lithium battery)
IT 1305-78-8, uses and miscellaneous 1344-28-1, uses and
miscellaneous
(layer, protective, for cover of lithium
battery with glass-metal joints)
IT 14024-11-4
(lithium battery with electrolyte from thionyl chloride contg.,
stabilized glass-metal joints for cover for)

=> D L102 1-26 BIB ABS HITSTR HITIND

L102 ANSWER 1 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 141:398264 HCA Full-text

TI Method for preparation of chemically crosslinked polyacrylonitrile
polymer electrolyte as separator for secondary battery

IN Chen, Show-An; Xue, Uan-Jie; Lee, Jen-Jeh; Wang, Po-Shen

PA Taiwan

SO U.S. Pat. Appl. Publ., 12 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2004224233	A1	20041111	US 2003-428789	
			200305	
			05	

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PRAI US 2003-428789 20030505 <--

AB A composite gel-type polymer electrolyte membrane, as a separator between the pos. and the neg. electrode for secondary battery, consists of crosslinked gel-type polyacrylonitrile (PAN) electrolytes, polyvinylidene fluoride (PVDF) polymers and liq. electrolytes. The crosslinked gel-type PAN electrolytes are copolymd. by acrylonitrile (AN) monomers and crosslinked monomers with two terminal acrylic acid ester function groups. The PVdF can be PVdF-co-HFP polymers contg. over 80% PVdF. The liq. electrolytes are made from using nonaq. solvents to dissolve alk. or alk. earth metallic salts. This invention has advantages of superior ionic conductivities and mech. strength at high temp., fine compatible to pos. and neg. electrodes and potential to be industrialized.

IT 7439-93-2, Lithium, uses 14024-11-4, Lithium
tetrachloroaluminate
(method for prepn. of chem. crosslinked polyacrylonitrile
electrolyte as separator for secondary battery)

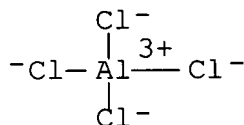
RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



● Li⁺

IC ICM H01M010-40
 ICS H01M004-58; H01M004-60; H01M004-40
 INCL 429303000; 429314000; 429316000; 429317000; 429307000; 429213000;
 429231950; 429231400
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
 IT Adhesion, physical
 Battery electrolytes
 Conducting polymers
 Ionic conductivity
 Secondary battery separators
 Swelling, physical
 (method for prepn. of chem. crosslinked polyacrylonitrile
 electrolyte as separator for secondary battery)
 IT 67-64-1, Acetone, uses 67-68-5, DmsO, uses 68-12-2, Dmf, uses
 96-48-0, γ -Butyrolactone 96-49-1, Ethylene carbonate
 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate
 110-71-4 463-79-6D, Carbonic acid, ester, acyclic 463-79-6D,
 Carbonic acid, ester, cyclic 556-65-0, Lithium thiocyanate
 616-38-6, Dimethyl carbonate 872-50-4, n-Methylpyrrolidone, uses
 7439-93-2, Lithium, uses 7440-44-0, Carbon, uses
 7447-41-8, Lithium chloride (LiCl), uses 7550-35-8, Lithium
 bromide (LiBr) 7704-34-9D, Sulfur, org. compds., polymers
 7791-03-9, Lithium perchlorate 9011-17-0, Hexafluoropropylene-
 vinylidene fluoride copolymer 10377-51-2, Lithium iodide
 10411-26-4, Butyl carbonate 12031-65-1, Lithium nickel oxide
 (LiNiO₂) 12057-17-9, Lithium manganese oxide (LiMn₂O₄)
 12162-79-7, Lithium manganese oxide limno₂ 12190-79-3, Cobalt
 lithium oxide (CoLiO₂) 14024-11-4, Lithium
 tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate
 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium
 hexafluorophosphate 24937-79-9, PvdF 29935-35-1, Lithium
 hexafluoroarsenate 30604-81-0, Polypyrrole 33454-82-9, Lithium
 triflate 39448-96-9, Graphite lithium 90076-65-6 132404-42-3
 132843-44-8 210406-60-3
 (method for prepn. of chem. crosslinked polyacrylonitrile
 electrolyte as separator for secondary battery)

L102 ANSWER 2 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 141:334893 HCA [Full-text](#)

TI Active metal/aqueous electrochemical cells and systems

IN Visco, Steven J.; Nimon, Yevgeniy S.

PA Polyplus Battery Company, USA

SO U.S. Pat. Appl. Publ., 50 pp., Cont.-in-part of U.S. Ser. No.
 731,771.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 5

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2004197641	A1	20041007	US 2004-772157 200402 03	

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US 2004126653 A1 20040701 US 2003-686189
200310
14

<--
US 2004142244 A1 20040722 US 2003-731771
200312
05

<--
AU 2004306866 A1 20050428 AU 2004-306866
200410
08

<--
CA 2542304 A1 20050428 CA 2004-2542304
200410
08

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WO 2005038953 A2 20050428 WO 2004-US33424
200410
08

<--
WO 2005038953 A3 20060413
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP,
KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD,
SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,
AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL,
PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG

EP 1673818 A2 20060628 EP 2004-794699
200410
08

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PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU,
PL, SK, HR

BR 2004015312 A 20061205 BR 2004-15312
200410
08

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CN 1894821 A 20070110 CN 2004-80037293
200410
08

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JP 2007513464 T 20070524 JP 2006-535572
200410
08

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US 2005100793 A1 20050512 US 2004-986441
200411
10

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MX 2006PA04233 A 20060628 MX 2006-PA4233
200604
12

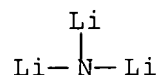
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PRAI US 2002-418899P P 20021015 <--
US 2003-511710P P 20031014 <--
US 2003-686189 A2 20031014 <--
US 2003-518948P P 20031110 <--
US 2003-526662P P 20031202 <--
US 2003-527098P P 20031203 <--
US 2003-731771 A2 20031205 <--
US 2004-536688P P 20040114
US 2004-536689P P 20040114
US 2004-772157 A 20040203
WO 2004-US33424 W 20041008

AB The invention concerns alkali (or other active) metal battery and other electrochem. cells incorporating active metal anodes together with aq. cathode/electrolyte systems. The battery cells have a highly ionically conductive protective membrane adjacent to the alkali metal anode that effectively isolates (de-couples) the alkali metal electrode from solvent, electrolyte processing and/or cathode environments, and at the same time allows ion transport in and out of these environments. Isolation of the anode from other components of a battery cell or other electrochem. cell in this way allows the use of virtually any solvent, electrolyte and/or cathode material in conjunction with the anode. Also, optimization of electrolytes or cathode-side solvent systems may be done without impacting anode stability or performance. In particular, Li/water, Li/air and Li/metal hydride cells, components, configurations and fabrication techniques are provided.

IT 7439-93-2, Lithium, uses 26134-62-3,
Lithium nitride (Li₃N)
(active metal/aq. electrochem. cells and systems)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 26134-62-3 HCA
CN Lithium nitride (Li₃N) (CA INDEX NAME)



IC ICM H01M014-00
ICS H01M002-16; H01M016-00; H01M004-86; H01M004-90
INCL 429137000; 429246000; 429105000; 429042000; 429040000; 429009000;
029623500
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57, 72
IT 64-19-7, Acetic acid, uses 546-89-4, Lithium acetate
1301-96-8, Silver oxide Ago 1308-80-1, Copper nitride cu₃n
1310-65-2, Lithium hydroxide 1332-37-2, Iron oxide, uses
1335-25-7, Lead oxide 7439-93-2, Lithium, uses
7447-41-8, Lithium chloride, uses 7550-35-8, Lithium bromide

(LiBr) 7647-01-0, Hydrochloric acid, uses 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses 7732-18-5, Water, uses 7789-24-4, Lithium fluoride, uses 10377-51-2, Lithium iodide 11129-60-5, Manganese oxide 12026-04-9, Nickel hydroxide oxide niooh 12057-29-3, Lithium phosphide li3p 12124-97-9, Ammonium bromide 12125-02-9, Ammonium chloride, uses 26134-62-3, Lithium nitride (Li3N) 184905-46-2, Lithium nitrogen phosphorus oxide
(active metal/aq. electrochem. cells and systems)

L102 ANSWER 3 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 141:298755 HCA Full-text

TI Ionically conductive membranes for protection of active metal anodes and battery cells

IN Visco, Steven J.; Nimon, Yevgeniy S.; Katz, Bruce D.

PA Polyplus Battery Company, USA

SO U.S. Pat. Appl. Publ., 25 pp., Cont.-in-part of U.S. Ser. No. 731,771.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 5

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2004191617	A1	20040930	US 2004-772228	20040203
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US 2004126653	A1	20040701	US 2003-686189	20031014
	<--			
US 2004142244	A1	20040722	US 2003-731771	20031205
	<--			
WO 2005038962	A2	20050428	WO 2004-US33372	20041008
	<--			
WO 2005038962	A3	20051229		
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RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
US 2005100793	A1	20050512	US 2004-986441	200411

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PRAI US 2002-418899P P 20021015 <--

US 2003-511710P P 20031014 <--

US 2003-686189 A2 20031014 <--

US 2003-518948P P 20031110 <--

US 2003-731771 A2 20031205 <--

US 2004-772228 A 20040203

AB Disclosed are ionically conductive membranes for protection of active metal anodes and methods for their fabrication. The membranes may be incorporated in active metal anode structures and battery cells. In accordance with the invention, the membrane has the desired properties of high overall ionic cond. and chem. stability towards the anode, the cathode and ambient conditions encountered in battery manufg. The membrane is capable of protecting an active metal anode from deleterious reaction with other battery components or ambient conditions while providing a high level of ionic cond. to facilitate manuf. and/or enhance performance of a battery cell in which the membrane is incorporated.

IT 7439-93-2, Lithium, uses 7439-93-2D, Lithium,
intercalation compd. 26134-62-3, Lithium nitride (Li₃N)
(ionically conductive membranes for protection of
active metal anodes and battery cells)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

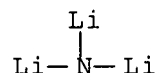
Li

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)

IC ICM H01M002-16

ICS H01M010-36

INCL 429137000; 429246000; 429304000; 429320000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

ST battery anode ionically conductive membrane

IT Battery anodes

Ceramics

Gélation agents

Glass ceramics

Ionic liquids

Primary batteries

- Secondary batteries
 - (ionically conductive membranes for protection of active metal anodes and battery cells)
- IT Esters, uses
 - Ethers, uses
 - Fluoropolymers, uses
 - Halides
 - Metallic glasses
 - Nitrides
 - Phosphonium compounds
 - Polyoxyalkylenes, uses
 - Polysulfides
 - (ionically conductive membranes for protection of active metal anodes and battery cells)
- IT Glass, uses
 - (oxynitride, phosphorus; ionically conductive membranes for protection of active metal anodes and battery cells)
- IT Group VA element compounds
 - (phosphides; ionically conductive membranes for protection of active metal anodes and battery cells)
- IT Oxynitrides
 - (phosphorus, glass; ionically conductive membranes for protection of active metal anodes and battery cells)
- IT Primary batteries
 - (solid-state; ionically conductive membranes for protection of active metal anodes and battery cells)
- IT Quaternary ammonium compounds, uses
 - (tetraalkyl; ionically conductive membranes for protection of active metal anodes and battery cells)
- IT Lithium alloy, base
 - (ionically conductive membranes for protection of active metal anodes and battery cells)
- IT 1308-80-1, Copper nitride Cu_3N
 - (coating; ionically conductive membranes for protection of active metal anodes and battery cells)
- IT 1308-87-8, Dysprosium oxide (Dy_2O_3) 1308-96-9, Europium oxide (Eu_2O_3) 1310-53-8, Germanium dioxide, uses 1313-97-9, Neodymium oxide (Nd_2O_3) 1314-23-4, Zirconia, uses 1314-37-0, Ytterbium oxide (Yb_2O_3) 1314-56-3, Phosphorus oxide (P_2O_5), uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 12024-21-4, Gallium oxide (Ga_2O_3) 12036-41-8, Terbium oxide (Tb_2O_3) 12036-44-1, Thulium oxide (Tm_2O_3) 12055-62-8, Holmium oxide (Ho_2O_3) 12057-24-8, Lithium oxide (Li_2O), uses 12060-58-1, Samarium oxide (Sm_2O_3) 12061-16-4, Erbium oxide (Er_2O_3) 12064-62-9, Gadolinium oxide (Gd_2O_3) 13463-67-7, Titania, uses (glass-ceramic; ionically conductive membranes for protection of active metal anodes and battery cells)
- IT 10377-52-3 12024-22-5, Gallium sulfide Ga_2S_3 12025-34-2, Germanium sulfide GeS_2 12136-58-2, Lithium sulfide (Li_2S) 13759-10-9, Silicon sulfide SiS_2

(glass; ionically conductive membranes for protection
of active metal anodes and battery cells)

- IT 79-20-9, Methyl acetate 96-47-9, 2-Methyltetrahydrofuran
105-58-8, Diethyl carbonate 107-31-3, Methyl formate 109-99-9,
Thf, uses 110-71-4, 1,2-Dimethoxyethane 463-79-6D, Carbonic
acid, org. esters 616-38-6, Dimethyl carbonate 623-53-0, Ethyl
methyl carbonate 646-06-0, 1,3-Dioxolane 1072-47-5,
1,3-Dioxolane, 4-methyl- 1313-13-9, Manganese dioxide, uses
1313-27-5, Molybdenumoxide moo3, uses 1314-62-1, Vanadium oxide
(V2O5), uses 1317-37-9, Iron sulfide Fes 1317-38-0, Copper oxide
(CuO), uses 1317-40-4, Copper sulfide Cus 7439-93-2,
Lithium, uses 7439-93-2D, Lithium, intercalation compd.
7447-41-8, Lithium chloride (LiCl), uses 7550-35-8, Lithium
bromide (LiBr) 7704-34-9, Sulfur, uses 7784-01-2, Silver
chromate 7789-24-4, Lithium fluoride, uses 9004-67-5, Methyl
cellulose 10377-51-2, Lithium iodide 11105-02-5, Silver vanadium
oxide 12037-42-2, Vanadium oxide v6o13 12039-13-3, Titanium
sulfide (TiS2) 12057-29-3, Lithium phosphide li3p 12068-85-8,
Iron sulfide fes2 12789-09-2, Copper vanadium oxide 15365-14-7,
Iron lithium phosphate felipo4 16969-45-2D, Pyridinium, derivs.
17009-90-4D, Imidazolium, derivs. 24937-79-9, PvdF 25014-41-9,
Polyacrylonitrile 25322-68-3, Peo 26134-62-3, Lithium
nitride (Li3N) 39300-70-4, Lithium nickeloxide 39457-42-6,
Lithium manganese oxide 52627-24-4, Cobalt lithium oxide
70780-99-3, Lisicon 77641-62-4, Nasicon 155371-19-0,
1-Ethyl-3-methylimidazolium hexafluorophosphate 184905-46-2,
Lithium nitrogen phosphorus oxide 244193-50-8,
1-Hexyl-3-methylimidazolium tetrafluoroborate 328090-25-1
445473-58-5, 1-Butyl-3-methylimidazolium octyl sulfate
(ionically conductive membranes for protection of
active metal anodes and battery cells)
- IT 7440-50-8, Copper, uses
(substrate; ionically conductive membranes for protection
of active metal anodes and battery cells)
- IT 11138-49-1, Sodium β -alumina 37220-89-6, Lithium
 β -alumina
(β -alumina type; ionically conductive membranes for
protection of active metal anodes and battery
cells)

L102 ANSWER 4 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 140:426171 HCA Full-text

TI Manufacture of inorganic protective film
coated separator for secondary lithium battery and the
battery

IN Cho, Jo-kun; Lee, Jong-ki; Lee, Sai-won; Lee, Sang-ryuk

PA Samsung Sdi Co., Ltd., S. Korea

SO Jpn. Kokai Tokkyo Koho, 11 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 2004158453 A 20040603 JP 2003-373605

200310
31

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KR 2004039568 A 20040512 KR 2002-67680
200211

02

CN 1494173 A 20040505 CN 2003-147274
200307
11

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US 2004106037 A1 20040603 US 2003-622468
200307
21

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US 7175937 B2 20070213
PRAI KR 2002-67680 A 20021102 <--

AB The battery has a separator between a cathode and an anode ; where the battery has an inorg. protective film formed on ≥ 1 side of the separator. The separator is manufd. by depositing a Li metal on a separator and contacting the deposited separator with N, SO₂, CO₂, or O to form an inorg. protective film.

IT 7439-93-2, Lithium, processes
(manuf. of separators contg. inorg. protective
films for secondary lithium batteries)

RN 7439-93-2 HCA

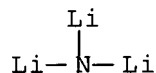
CN Lithium (CA INDEX NAME)

Li

IT 26134-62-3P, Lithium nitride (Li₃N)
(manuf. of separators contg. inorg. protective
films for secondary lithium batteries)

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)



IC ICM H01M002-16

ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium battery inorg protective film
coated separator manuf

IT Secondary battery separators
(manuf. of separators contg. inorg. protective
films for secondary lithium batteries)

IT 7439-93-2, Lithium, processes 10377-52-3, Lithium
phosphate

(manuf. of separators contg. inorg. protective
films for secondary lithium batteries)

IT 9003-07-0, Polypropylene

(manuf. of separators contg. inorg. protective
films for secondary lithium batteries)

IT 26134-62-3P, Lithium nitride (Li₃N) 668998-68-3P, Lithium
phosphorus nitride oxide (LiPNO)

(manuf. of separators contg. inorg. protective
films for secondary lithium batteries)

L102 ANSWER 5 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 140:324230 HCA Full-text

TI Lithium metal anode for

lithium battery

IN Cho, Chung-Kun; Lee, Sang-Mock; Lee, Jong-Ki; Kim, Min-Seuk

PA Samsung SDI Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 5 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2004072066	A1	20040415	US 2003-389752	
			200303	
			18	
		<--		
KR 2004035909	A	20040430	KR 2002-62256	
			200210	
			12	
CN 1489229	A	20040414	CN 2003-120528	
			200303	
			13	
		<--		
JP 2004134403	A	20040430	JP 2003-349215	
			200310	
			08	
		<--		

JP 3787564 B2 20060621

PRAI KR 2002-62256 A 20021012 <--

AB Provided is a lithium metal anode having a lithium metal layer and a porous polymer film integrated with a surface of the lithium metal layer. The lithium metal anode further includes a current collector attached to the surface of the lithium metal layer opposite the porous polymer film. The lithium metal anode further includes a protective coating layer between the porous polymer film and the lithium metal layer, the protective coating layer having lithium ionic cond. and impermeable to an electrolyte.

IT 7439-93-2, Lithium, uses 7439-93-2D,

Lithium, salt 26134-62-3, Lithium
nitride

(lithium metal anode for
lithium battery)

RN 7439-93-2 HCA

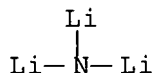
CN Lithium (CA INDEX NAME)

Li

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 26134-62-3 HCA
CN Lithium nitride (Li₃N) (CA INDEX NAME)



IC ICM H01M002-16
ICS H01M002-18; H01M004-40; H01M010-04
INCL 429137000; 429231950; 429246000; 029623200
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST lithium metal anode battery
IT Polyoxyalkylenes, uses
Polysiloxanes, uses
(layer; lithium metal anode for
lithium battery)
IT Battery anodes
Coating materials
(lithium metal anode for
lithium battery)
IT Fluoropolymers, uses
(lithium metal anode for
lithium battery)
IT Secondary batteries
(lithium; lithium metal
anode for lithium battery)
IT Ethers, uses
(polycyclic, fluoro-; lithium metal
anode for lithium battery)
IT Energy-rich phosphates
(polymers; lithium metal anode for
lithium battery)
IT 7440-02-0, Nickel, uses 7440-50-8, Copper, uses
(current collector; lithium metal
anode for lithium battery)
IT 9002-88-4, Polyethylene 9003-07-0, Polypropylene
(film; lithium metal anode for
lithium battery)
IT 25322-68-3, Peo 413569-08-1, 2-Propenoic acid, ion(1-)
homopolymer, uses
(layer; lithium metal anode for
lithium battery)
IT 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane 646-06-0,
Dioxolane 7439-93-2, Lithium, uses

7439-93-2D, Lithium, salt 10377-52-3,
Lithium phosphate 12627-14-4, Lithium silicate
12676-27-6 26134-62-3, Lithium nitride
33454-82-9, Lithium triflate 37220-89-6, Lithium
aluminate 39302-37-9, Lithium titanium oxide 152747-89-2,
Lanthanum lithium oxide 184905-46-2, Lithium nitrogen
phosphorus oxide 236388-73-1, Lithium silicide sulfide
236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum
lithium sulfide 236388-76-4, Lithium phosphide sulfide
342379-43-5, Germanium lithium sulfide
(lithium metal anode for
lithium battery)

IT 9002-84-0, Ptfе 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-
vinylidene fluoride copolymer 24937-79-9, Pvdф 25014-41-9,
Polyacrylonitrile 25067-11-2, Hexafluoropropylene-
tetrafluoroethylene copolymer 59947-24-9, Polychlorofluoroethylene
(lithium metal anode for
lithium battery)

L102 ANSWER 6 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 134:210510 HCA Full-text

TI Solid polymer electrolytes

IN Munshi, M. Zafar A.

PA Lithium Power Technologies, Inc., USA

SO PCT Int. Appl., 52 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	WO	2001017051	A1	20010308	WO 2000-US22915
					200008
					21

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W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,
CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,
LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ,
PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ,
UA, UG, UZ, VN, YU, ZA, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,
BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US	6645675	B1	20031111	US 1999-388741
				199909
				02

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TW	244230	B	20051121	TW 2000-89116077
				200008
				10

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CA	2382118	A1	20010308	CA 2000-2382118
				200008
				21

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AU 200069217 A 20010326 AU 2000-69217
200008
21

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EP 1224706 A1 20020724 EP 2000-957626
200008
21

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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO, MK, CY, AL
JP 2003508886 T 20030304 JP 2001-520496
200008
21

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PRAI US 1999-388741 A 19990902 <--
WO 2000-US22915 W 20000821 <--

AB A wide range of solid polymer electrolytes characterized by high ionic cond. at room temp., and below, are disclosed. These all-solid-state polymer electrolytes are suitable for use in electrochem. cells and batteries. A preferred polymer electrolyte is a cationic conductor which is flexible, dry, non-tacky, and lends itself to economical manuf. in very thin film form. Solid polymer electrolyte compns. which exhibit a cond. of at least approx. 10^{-3} - 10^{-4} S/cm at 25° comprise a base polymer or polymer blend contg. an elec. conductive polymer, a metal salt, a finely divided inorg. filler material, and a finely divided ion conductor. The new solid polymer electrolytes are combinable with various neg. electrodes such as an alkali metal, alk. earth metal, transition metal, ion-insertion polymers, ion-insertion inorg. electrodes, carbon insertion electrodes, tin oxide electrode, among others, and various pos. electrodes such as ion-insertion polymers and ion-insertion inorg. electrodes to provide batteries and supercapacitors having high specific energy (Wh/kg) (gravimetric) and energy d. (Wh/L) (volumetric), high cycle life, low self-discharge and providing improved safety.

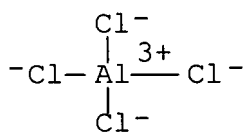
IT 7439-93-2, Lithium, uses 7439-93-2D, Lithium,
complex with polymer, uses
(manuf. of solid polymer electrolytes for electrochem. cells)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IT 14024-11-4, Lithium tetrachloroaluminate
(manuf. of solid polymer electrolytes for electrochem. cells)
RN 14024-11-4 HCA
CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



● Li⁺

IC ICM H01M010-40

ICS H01G009-02; H01B001-12; H01M004-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 76

IT 7439-93-2, Lithium, uses 7439-93-2D, Lithium, complex with polymer, uses 9002-83-9, Poly(chlorotrifluoroethylene) 9002-84-0, Ptfе 9002-86-2, Polyvinyl chloride 9003-07-0, Polypropylene 9010-79-1D, Ethylene-propylene copolymer, fluorinated 9011-14-7, Pmma 24937-79-9, Pvdф 25067-61-2, Polymethacrylonitrile 25101-45-5, Ethylene-chlorotrifluoroethylene copolymer 25322-68-3, Peo 132404-42-3

(manuf. of solid polymer electrolytes for electrochem. cells)

IT 7439-93-2D, Lithium, salt, uses 7439-95-4D, Magnesium, salt, uses 7440-09-7D, Potassium, salt, uses 7440-23-5D, Sodium, salt, uses 7440-70-2D, Calcium, salt, uses 7791-03-9, Lithium perchlorate 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium trifluoromethanesulfonate 90076-65-6, Lithiumbis(trifluoromethanesulfonyl)imide

(manuf. of solid polymer electrolytes for electrochem. cells)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L102 ANSWER 7 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 132:125362 HCA Full-text

TI Protective coatings for battery anodes

IN Visco, Steven J.; Chu, May-Ying

PA Polyplus Battery Company, Inc., USA

SO U.S., 18 pp., Cont.-in-part of U.S. 5,789,108.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 15

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6025094	A	20000215	US 1998-86665	19980529
		<--		
US 5523179	A	19960604	US 1994-344384	199411

23

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US 5582623 A 19961210 US 1995-479687
199506
07

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US 5686201 A 19971111 US 1996-686609
199607
26

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US 5789108 A 19980804 US 1997-814927
199703
11

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US 2001041294 A1 20011115 US 2001-901970
200107
09

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US 6723140 B2 20040420
PRAI US 1994-344384 A2 19941123 <--
US 1995-479687 A2 19950607 <--
US 1996-686609 A2 19960726 <--
US 1997-814927 A2 19970311 <--
US 1998-86665 A 19980529 <--
US 1998-139601 A 19980825 <--
US 1998-139603 A1 19980825 <--

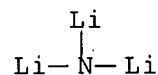
AB Disclosed is an alkali metal neg. electrode having a protective layer. Specifically, the disclosed neg. electrode includes a glassy or amorphous surface protective layer which conducts alkali metal ions but effectively blocks the alkali metal in the electrode from direct contact with the ambient. The protective layer has improved smoothness and reduced internal stress in comparison to prior protective layers such as those formed by sputtering. In a specific embodiment, the protective layer is formed on the lithium metal electrode surface by a plasma assisted deposition technique.

IT 7439-93-2, Lithium, uses
(protective coatings for battery
anodes)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

IT 26134-62-3, Lithium nitride
(protective coatings for battery
anodes)
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IC ICM H01M004-58

INCL 429231950

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery anode protective coating

IT Coating process

(plasma spraying; protective coatings for
battery anodes)

IT Battery anodes

Coating materials

Secondary batteries

(protective coatings for battery
anodes)

IT Lithium alloy, base

Sodium alloy, base

(protective coatings for battery
anodes)

IT 3277-26-7, 1,1,3,3-Tetramethyldisiloxane 7440-21-3D, Silicon, org.
compds., reactions 7440-42-8, Boron, reactions 7723-14-0,
Phosphorus, reactions

(precursor; protective coatings for battery
anodes)

IT 7439-93-2, Lithium, uses 7440-23-5, Sodium, uses

12798-95-7 256448-58-5, CZ50

(protective coatings for battery
anodes)

IT 554-13-2, Lithium carbonate 1303-86-2, Boron oxide b_2o_3 , uses

1314-80-3, Phosphorus pentasulfide 7631-86-9, Silica, uses

10377-51-2, Lithium iodide 10377-52-3, Lithium phosphate li_3po_4

12057-24-8, Lithia, uses 12627-14-4, Lithium silicate 12676-27-6

26134-62-3, Lithium nitride 37220-89-6, Lithium aluminate

184905-46-2, Lithium nitrogen phosphorus oxide 236388-73-1,

Lithium silicide sulfide 236388-74-2, Lithium boride sulfide

236388-75-3, Aluminum lithium sulfide 236388-76-4, Lithium

phosphide sulfide

(protective coatings for battery
anodes)

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L102 ANSWER 8 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 123:61262 HCA [Full-text](#)

TI Corrosion of the anode in lithium power sources

AU Kedrinskii, I. A.; Gerasimova, L. K.; Shilkin, V. I.; Shmyd'ko, I.

I.

CS Res. Prod. Complex, Siberian Technol. Inst., Krasnoyarsk, 660049,
Russia

SO Russian Journal of Electrochemistry (Translation of Elektrokimiya)
(1995), 31(4), 329-36

CODEN: RJELE3; ISSN: 1023-1935

PB MAIK Nauka/Interperiodica

DT Journal

LA English

AB Dependence of the open circuit voltage of the lithium electrode on the compn. and properties of the surface film on the electrode is considered. The voltage departure from the equil. value is found to be a function of the corrosion rate and the ratio of the ionic and electronic conductivities of the film. This ratio is shown to be related to nonstoichiometry of the surface film and the presence of donor impurities in it. Anal. of the exptl. results is conducted in terms of the notions on the operation of an electrochem. corrosion cell transferred from a gas phase into a nonaq.-electrolyte environment. The results

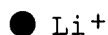
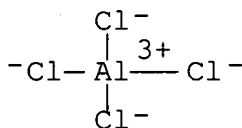
acquired provide a basis for the description of factors leading to a decrease in the open circuit voltage and to accelerated capacity loss of the lithium battery during storage.

IT 14024-11-4, Lithium tetrachloroaluminate

(corrosion of the anode in lithium power sources)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



IT 7439-93-2, Lithium, reactions

(corrosion of the anode in lithium power sources)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium battery anode corrosion

IT Electrode reaction

(corrosion of the anode in lithium power sources)

IT 108-32-7, Propylene carbonate 110-71-4 7791-03-9, Lithium

perchlorate 14024-11-4, Lithium tetrachloroaluminate

(corrosion of the anode in lithium power sources)

IT 7439-93-2, Lithium, reactions

(corrosion of the anode in lithium power sources)

IT 7719-09-7, Thionyl chloride

(electrolyte contg.; corrosion of the anode in lithium power sources)

L102 ANSWER 9 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 121:61539 HCA Full-text

TI Protective lithium ion conducting ceramic coating for
lithium metal anodes

IN Bates, John B.

PA Martin Marietta Energy Systems, Inc., USA

SO U.S., 4 pp.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

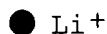
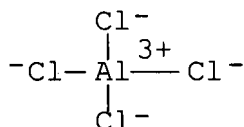
PATENT NO. KIND DATE APPLICATION NO. DATE

AB The cycling efficiency and corrosion rate of Li electrodes were measured in half cells. The electrolyte soln. used was LiAlCl_4 and SO_2 with cond. of 2.2 mS/cm at -25° and 98 mS/cm at 60° . The Li cycling efficiency was .apprx.98% at 40 mA/cm² for ≥ 50 cycles. Depending on improved electrolyte prepn., the c.d. for Li corrosion could be reduced from 12.1 to 6.5 $\mu\text{A}/\text{cm}^2$. The results indicate stability, compatibility, and high-rate capability of the Li/inorg. electrolyte soln. system.

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl_4)
(electrolyte contg. sulfur dioxide and, lithium cycling efficiency and corrosion rate in, for batteries)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

IT Battery electrolytes
(lithium tetrachloroaluminate-sulfur dioxide,
lithium cycling efficiency and corrosion rate in)

IT Electric conductivity and conduction
(of lithium tetrachloroaluminate-sulfur dioxide electrolyte,
temp. effect on)

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl_4)
(electrolyte contg. sulfur dioxide and, lithium cycling efficiency and corrosion rate in, for batteries)

L102 ANSWER 11 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 111:118135 HCA Full-text

TI An electrochemical investigation of the temperature dependence of
inorganic electrolytes in rechargeable lithium batteries

AU Lee, T. J.; Fey, G. T. K.; Yao, P. C.; Chen, S. Y.

CS Dep. Chem. Eng., Natl. Cent. Univ., Ghungli, 32054, Taiwan

SO Journal of Power Sources (1989), 26(3-4), 511-17

CODEN: JPSODZ; ISSN: 0378-7753

DT Journal

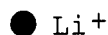
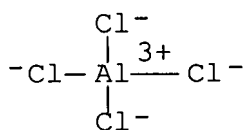
LA English

AB The effect of temp. on the stability of $\text{LiAlCl}_4/\text{SO}_2$ and $\text{LiGaCl}_4/\text{SO}_2$ electrolytes was studied by cyclic voltammetry and cond. methods using a Pt electrode; the effect of temp. on the cond. of films on Li electrodes was studied by an a.c. impedance technique. LiGaCl_4 had better cond. and was more stable than LiAlCl_4 . For both electrolytes at $<25^\circ$, the cond. increased with temp., but at $>25^\circ$, the cond. decreased with increasing temp. The implication of a change in the ionic transport mechanism is discussed.

IT 14024-11-4, Lithium tetrachloroaluminate
(electrolyte, stability of, in sulfur dioxide, temp. effect on,
in lithium secondary batteries)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72, 76

ST lithium battery inorg electrolyte stability; chloroaluminate lithium electrolyte battery; chlorogallate lithium electrolyte battery; sulfur dioxide lithium battery electrolyte

IT Batteries, secondary
(lithium-sulfur dioxide, stability of lithium tetrachloroaluminate and lithium tetrachlorogallate in, temp. effect on)

IT Electric conductivity and conduction
(of lithium tetrachloroaluminate or lithium tetrachlorogallate in sulfur dioxide, in lithium secondary batteries)

IT 14024-11-4, Lithium tetrachloroaluminate 15955-98-3, Lithium tetrachlorogallate
(electrolyte, stability of, in sulfur dioxide, temp. effect on, in lithium secondary batteries)

L102 ANSWER 12 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 111:42823 HCA [Full-text](#)

TI Inorganic electrolyte lithium/cupric chloride rechargeable cell

AU Dey, A. N.; Bowden, W. L.; Kuo, H. C.; Gopikanth, M. L.; Schlaikjer, C.; Foster, D.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Journal of the Electrochemical Society (1989), 136(6), 1618-21

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

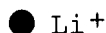
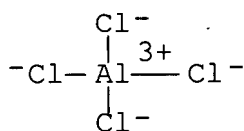
LA English

AB A rechargeable Li/CuCl₂ battery with LiAlCl₄-3SO₂ electrolyte has a highly reversible Li-solvent chem. with a Li turnover figure of merit of ≤194 and a capacity of 7-8 A-h. The reversibility of the electrolyte-Li reaction allows the use of systematic overcharge to eliminate irreversible loss of Li and to provide for cell balancing.

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl₄)
(electrolytes, contg. sulfur dioxide, in lithium-cupric chloride batteries)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

IT Electric conductivity and conduction

(of lithium tetrachloroaluminate-sulfur dioxide electrolyte, temp. effect on)

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl_4)

(electrolytes, contg. sulfur dioxide, in lithium-cupric chloride batteries)

L102 ANSWER 13 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 110:138644 HCA [Full-text](#)

TI Electrochemical study of halides and oxhalides in lithium tetrachloroaluminate, sulfur dioxide electrolyte. I.

Electrochemical studies of sulfuryl chloride

AU Lojou, E.; Messina, R.; Perichon, J.; Descroix, J. P.; Sarre, G.

CS LECSO, CNRS, Thiais, 94320, Fr.

SO Journal of the Electrochemical Society (1989), 136(2), 293-8

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

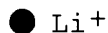
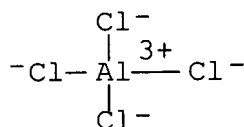
AB The electrochem. redn. of SO_2Cl_2 at glassy C and Pt electrodes in $\text{LiAlCl}_4\text{-3SO}_2$ solvate was studied to det. the processes at the electrochem. interface in $\text{Li/SO}_2\text{Cl}_2$ batteries. Chronopotentiometric studies indicate that at low SO_2Cl_2 concn. ($<5 \times 10^{-2}$ M), the reaction is controlled by a diffusion process; the diffusion coeff. is 5×10^{-6} cm^2/s . At concn. of $>5 \times 10^{-2}$ M, the current is no longer proportional to the concn., but the relation between c.d. and transition time is similar to the Sand equation and the rate of electron transfer is controlled by diffusion of SO_2Cl_2 through a LiCl build-up layer, with a diffusion coeff. of 10^{-10} cm^2/s .

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl_4)

(electrolytes contg. sulfur dioxide and, sulfuryl chloride redn. in, interface effects in)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

IT Electric conductivity and conduction

(of lithium chloroaluminate-sulfur dioxide electrolytes, concn. effect on, lithium battery mechanism in relation to)

IT Reduction, electrochemical

(of sulfuryl chloride, at platinum electrode, in lithium chloroaluminate-sulfur dioxide electrolyte, lithium battery mechanism in relation to)

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl_4)

(electrolytes contg. sulfur dioxide and, sulfuryl chloride redn. in, interface effects in)

L102 ANSWER 14 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 110:26607 HCA Full-text

TI New highly conductive inorganic electrolytes. The liquid sulfur dioxide solvates of the alkali and alkaline earth metal tetrachloroaluminates

AU Foster, D. L.; Kuo, H. C.; Schlaikjer, C. R.; Dey, A. N.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Journal of the Electrochemical Society (1988), 135(11), 2682-6

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

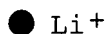
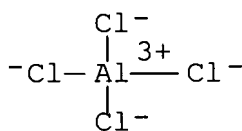
AB The liq. SO_2 solvates of the tetrachloroaluminate of Li, Na, Ca, and/or Sr are highly conductive (.apprx. $10^{-1}/\Omega\text{-cm}$) inorg. electrolytes with low SO_2 vapor pressure. The addn. of the SO_2 solvate of NaAlCl_4 , $\text{Ca}(\text{AlCl}_4)_2$, or $\text{Sr}(\text{AlCl}_4)_2$ to LiAlCl_4 :3 SO_2 lowers the f.p. considerably. The Li stability at elevated temps. is best in electrolytes with higher SO_2 content such as LiAlCl_4 :6 SO_2 , or SO_2 solvate electrolyte contg. NaAlCl_4 , than that of an electrolyte contg. pure LiAlCl_4 :3 SO_2 .

IT 14024-11-4, Lithium tetrachloroaluminate

(sulfur dioxide-solvated, electrolytes, properties of, for batteries)

RN 14024-11-4 HCA

CN Aluminate(I-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 76

IT Batteries, secondary

(lithium-sulfur dioxide, sulfur dioxide solvates of alkali metal and alk. earth tetrachloroaluminates as electrolytes for)

IT Electric conductivity and conduction

Vapor pressure

(of sulfur dioxide solvates of alkali metal and alk. earth
tetrachloroaluminates, for battery electrolytes)

IT 7784-16-9, Sodium tetrachloroaluminate 14024-11-4, Lithium
tetrachloroaluminate 20066-22-2 21308-66-7
(sulfur dioxide-solvated, electrolytes, properties of, for
batteries)

L102 ANSWER 15 OF 26 HCA COPYRIGHT 2007 ACS on STN
AN 109:173540 HCA [Full-text](#)

TI Inorganic electrolyte lithium/sulfur dioxide rechargeable system.
Development of a prototype hermetic C cell and evaluation of its
performance and safety characteristics

AU Dey, A. N.; Kuo, H. C.; Piliero, P.; Kallianidis, M.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Journal of the Electrochemical Society (1988), 135(9),
2115-20

CODEN: JESQAN; ISSN: 0013-4651

DT Journal

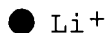
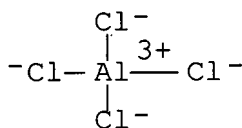
LA English

AB A prototype sealed C-size Li/SO₂ battery with LiAlCl₄-6 SO₂ electrolyte and a carbon black cathode plate has an open-circuit voltage of 3.2 V, a nominal capacity of 1.8 A-h, and an energy d. of 135 W-h/kg. The battery has a cycle life of 50 cycles at 1 A (3.4 mA/cm²) discharge to a 2.0 V cut-off voltage, with 0.1 A (0.34 mA/cm²) charge. The battery can sustain periods of extended overcharge but discharge below 1.0 V is hazardous. The prototype battery design, cathode plate and separator material evaluation, performance, and safety parameters are described.

IT 14024-11-4, Lithium chloroaluminate (LiAlCl₄)
(electrolytes contg., lithium-sulfur dioxide
batteries contg., performance and safety of)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 72

ST lithium sulfur dioxide battery safety;
electrolyte lithium chloroaluminate sulfur dioxide

IT Carbon black, uses and miscellaneous
(cathode plates, evaluation of, for lithium-
sulfur dioxide rechargeable batteries)

IT Electric conductivity and conduction
(of lithium chloroaluminate-sulfur dioxide electrolyte, in
lithium rechargeable batteries)

IT Batteries, secondary
(sealed, lithium-sulfur dioxide, with
lithium chloroaluminate-sulfur dioxide electrolyte,

- performance and safety of)
- IT Batteries, secondary
(separators, Celgard and polyethylene, in lithium-sulfur dioxide batteries, pressure increase and safety in relation to)
- IT 9002-88-4, Polyethylene 9003-07-0, Celgard 3401
(battery separators, in lithium-sulfur dioxide batteries, pressure increase and safety in relation to)
- IT 9002-84-0, PTFE
(cathode plates contg. carbon black and, evaluation of, for lithium-sulfur dioxide rechargeable batteries)
- IT 14024-11-4, Lithium chloroaluminate (LiAlCl₄)
(electrolytes contg., lithium-sulfur dioxide batteries contg., performance and safety of)

L102 ANSWER 16 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 108:207647 HCA [Full-text](#)

TI Cell performance and electrochemical studies of inorganic electrolytes in rechargeable lithium sulfur dioxide systems

AU Fey, G. T. K.; Lee, T. J.; Leu, F. C.; Yao, P. C.; Chen, S. Y.; Hao, C. S.

CS Dep. Chem. Eng., Natl. Cent. Univ., Chungli, Taiwan

SO Proceedings - Electrochemical Society (1988), 88-6(Proc.

Symp. Primary Second. Ambient Temp. Lithium Batteries, 1987), 363-81

CODEN: PESODO; ISSN: 0161-6374

DT Journal

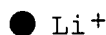
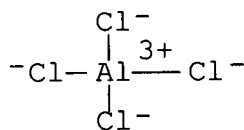
LA English

AB The cond. of LiGaCl₄ is of the same order as that of LiAlCl₄ but slightly higher under most conditions in liq. SO₂ at 0.1 to 2 M and -25 to +40°. Rechargeable Li batteries contg. 2 M LiAlCl₄ or 1M LiGaCl₄ in liq. SO₂ show promising performances in terms of elec. cond., redox behavior, discharge characteristics, and cycle life. Cyclic voltammetric data are presented for 0.1M LiAlCl₄ and 3.1M LiGaCl₄ in SO₂ of a Pt electrode at various temps.

IT 14024-11-4
(elec. cond. of, in liq. sulfur dioxide, temp. effect on, for rechargeable lithium-sulfur dioxide batteries)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium sulfur dioxide secondary battery

; chlorogallate sulfur dioxide electrolyte battery; chloroaluminate

sulfur dioxide electrolyte battery

- IT **Batteries, secondary**
(lithium-sulfur dioxide, lithium tetrachloroaluminate and lithium tetrachlorogallate electrolytes for, properties of)
- IT **Electric conductivity and conduction**
(of lithium tetrachloroaluminate and lithium tetrachlorogallate in liq. sulfur dioxide, temp. effect on)
- IT 7446-09-5, Sulfur dioxide, uses and miscellaneous
(elec. cond. of lithium tetrachloroaluminate and lithium tetrachlorogallate in, temp. effect on, for rechargeable lithium-sulfur dioxide batteries)
- IT 14024-11-4 15955-98-3, Lithium tetrachlorogallate
(elec. cond. of, in liq. sulfur dioxide, temp. effect on, for rechargeable lithium-sulfur dioxide batteries)

L102 ANSWER 17 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 108:8772 HCA [Full-text](#)

TI Study of the lithium/lithium nitride electrode in an organic electrolyte

AU Thevenin, J. G.; Muller, R. H.

CS Lawrence Berkeley Lab., Univ. California, Berkeley, CA, 94720, USA

SO Journal of the Electrochemical Society (1987), 134(11), 2650-6

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

AB Li₃N was studied as a possible solid-electrolyte interface between the Li electrode and an org. electrolyte. The Li/Li₃N electrode was prep'd. by exposing Li to a pure Ni atm. at ambient temp. This procedure leads to the formation of a porous film, resulting from a decrease in the molar volume during the reaction. The impedance behavior of the Li/Li₃N electrode can be interpreted by a porous-film model deduced from a transmission-line model. The slow filling of the micropores of the film and the reaction of Li with the electrolyte at the pore bases are responsible for changes of impedance and open-circuit potential with time and under cycling.

IT 7439-93-2, Lithium, uses and miscellaneous
(anodes, lithium nitride protective layer for, stability in org. electrolyte in relation to)

RN 7439-93-2 HCA

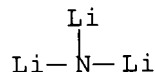
CN Lithium (CA INDEX NAME)

Li

IT 26134-62-3, Lithium nitride (Li₃N)
(solid electrolytes, lithium anode protective layer of, stability in org. electrolyte in relation to)

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium nitride solid electrolyte interface; anode lithium protection electrolyte interface

IT Electric impedance

Electrolytic polarization

(of lithium anodes, lithium nitride protective layer effect on)

IT Anodes

(battery, lithium, lithium nitride protective layer for, stability in org. electrolyte in relation to)

IT 7439-93-2, Lithium, uses and miscellaneous

(anodes, lithium nitride protective layer for, stability in org. electrolyte in relation to)

IT 108-32-7, Propylene carbonate 7791-03-9, Lithium perchlorate (LiClO₄)

(electrolytes contg., lithium anode stability in, lithium nitride protective layer effect on)

IT 26134-62-3, Lithium nitride (Li₃N)

(solid electrolytes, lithium anode protective layer of, stability in org. electrolyte in relation to)

L102 ANSWER 18 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 107:99695 HCA [Full-text](#)

TI Properties of lithium chloride layers formed on lithium in various thionyl chloride solutions

AU Mogensen, M.

CS Metall. Dep., Risoe Natl. Lab., Roskilde, DK-4000, Den.

SO Journal of Power Sources (1987), 20(1-2), 53-9

CODEN: JPSODZ; ISSN: 0378-7753

DT Journal

LA English

AB The growth rate of LiCl solid electrolyte layers on Li anodes was studied in neutral and acid LiAlCl₄-SOCl₂ solns. over periods of years. For SO₂-contg. acid solns., a small anodic load resulting from the coupling of Li to stainless steel proved to be more important than the acidity. The ionic and electronic conductivities of the layers were derived from impedance measurements and passivation rates, resp. In neutral solns., the Li⁺ cond. decreased with increase in the layer thickness; this effect was not obsd. in acid SO₂-contg. solns. Factors influencing the growth rate of the LiCl layer are briefly analyzed. Increasing the ratio of ionic to electronic cond. is the most efficient way of improving the performance of the solid electrolyte.

IT 7439-93-2, uses and miscellaneous

(anodes, lithium chloride layers formed on, in thionyl chloride solns., in batteries)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

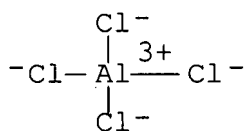
Li

IT 14024-11-4

(electrolytes, contg. thionyl chloride, lithium chloride layers formed on lithium anodes in, properties of; in batteries)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium chloride layer lithium anode; thionyl chloride

lithium anode interface; electrolyte interface cond

lithium anode; battery lithium chloride layer

anode

IT Electric conductivity and conduction

(of lithium chloride layer on lithium anodes, in
thionyl chloride)

IT Anodes

(battery, lithium, lithium chloride layers formed on, properties
of, in thionyl chloride soln.)

IT Electric conductivity and conduction

(ionic, of lithium chloride layer on lithium
anodes, in thionyl chloride)

IT 7439-93-2, uses and miscellaneous

(anodes, lithium chloride layers formed on, in thionyl
chloride solns., in batteries)

IT 7446-09-5, uses and miscellaneous 7446-70-0, uses and
miscellaneous 14024-11-4

(electrolytes, contg. thionyl chloride, lithium chloride layers
formed on lithium anodes in, properties of, in
batteries)

IT 7447-41-8, Lithium chloride, properties

(ionic and electronic cond. of, formed on lithium anode
, in thionyl chloride solns.)

L102 ANSWER 19 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 107:25970 HCA [Full-text](#)

TI New highly conductive inorganic electrolytes. The liquid sulfur
dioxide solvates of the alkali and alkaline earth metal
tetrachloroaluminates

AU Foster, D. L.; Kuo, H. C.; Schlaikjer, C. R.; Kallianidis, M.; Dey,
A. N.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Proceedings - Electrochemical Society (1987), 87-1(Proc.

Symp. Lithium Batteries, 1986), 477-89

CODEN: PESODO; ISSN: 0161-6374

DT Journal

LA English

AB LiAlCl_4 - SO_2 electrolytes for batteries have a cond. of .apprx.0.1/ Ω -cm at ambient temp. The cond. max. is obsd. for
 $\text{LiAlCl}_4.6\text{SO}_2$. The equil. vapor pressure of SO_2 over $\text{LiAlCl}_4.3\text{SO}_2$ is <1 atm. at room temp. $\text{LiAlCl}_4.6\text{SO}_2$ remains in

a liq. state even at -30°. The addn. of the SO₂ solvate of NaAlCl₄, Ca(AlCl₄)₂, or Sr(AlCl₄)₂ to LiAlCl₄ .3SO₂ lowers the f.p. considerably. The Li stability at elevated temps. is best in electrolytes with higher SO₂ content (such as LiAlCl₄.6SO₂ or SO₂ solvate electrolyte contg. NaAlCl₄) than an electrolyte contg. LiAlCl₄.3SO₂. The Li plating-stripping efficiency is very high, esp. for electrolytes contg. only LiAlCl₄ as the electrolyte salt.

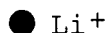
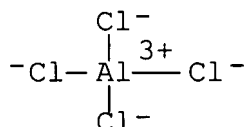
IT 14024-11-4D, Lithium tetrachloroaluminate (LiAlCl₄

), sulfur dioxide complex

(elec. cond. of, for battery electrolytes)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Batteries, primary

(lithium, sulfur dioxide-alkali and alk.

earth metal tetrachloroaluminate complex electrolytes for, properties of)

IT Electric conductivity and conduction

(of sulfur dioxide solvates of alkali and alk. earth metal tetrachloroaluminates, for battery electrolytes)

IT 7446-09-5D, Sulfur dioxide, complexes of alkali and alk. earth metal tetrachloroaluminates 7784-16-9D, sulfur dioxide complex

14024-11-4D, Lithium tetrachloroaluminate (LiAlCl₄

), sulfur dioxide complex 20066-22-2D, sulfur dioxide complex

21308-66-7D, sulfur dioxide complex

(elec. cond. of, for battery electrolytes)

L102 ANSWER 20 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 106:159517 HCA [Full-text](#)

TI Kinetics of lithium chloride film formation on lithium anodes in thionyl chloride

AU Mogensen, Mogens

CS Metall. Dep., Riso Natl. Lab., Roskilde, DK-4000, Den.

SO Risoe Natl. Lab., [Rep.] Risoe-M (1987), Risoe-M-2619, 88 pp.

CODEN: RNLDD7; ISSN: 0418-6435

DT Report; General Review

LA English

AB The addn. of SO₂AlCl₃ to the LiAlCl₄ catholyte in com. Li/SOCl₂ batteries stops the passivation of the Li anode by promoting LiCl pptn. at the glass fiber separator. The formation of LiCl film at Li anodes was monitored using a.c. impedance measurements for ≤4 yr and the film morphol. was studied by SEM. A film formation kinetic model was developed based on exptl. results.

IT 7439-93-2, Lithium, uses and miscellaneous (anodes, lithium chloride film passivation of, formation mechanism and prevention of)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 67, 72

ST lithium anode passivation battery; model lithium chloride film anode; review lithium anode passivation battery; kinetics lithium anode passivation battery

IT Process simulation, physicochemical (of lithium chloride film formation, on lithium anodes, in thionyl chloride batteries)

IT Electric resistance (of lithium chloride films, lithium anode passivation in relation to)

IT Kinetics of passivation (electrochem., of lithium anodes, by lithium chloride film, in batteries)

IT Electric conductivity and conduction (ionic, of lithium chloride films, lithium anode passivation in relation to)

IT 7439-93-2, Lithium, uses and miscellaneous (anodes, lithium chloride film passivation of, formation mechanism and prevention of)

IT 7447-41-8, Lithium chloride, uses and miscellaneous (lithium anode passivation by, film formation mechanism and prevention in relation to)

IT 107901-88-2 (lithium anode passivation prevention by, lithium chloride film formation mechanism in relation to)

L102 ANSWER 21 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 106:7470 HCA [Full-text](#)

TI Inorganic electrolyte rechargeable lithium/sulfur dioxide system

AU Dey, A. N.; Kuo, H. C.; Foster, D.; Schlaikjer, C.; Kallianidis, M.

CS Duracell Res. Cent., Duracell Inc., Needham, MA, 02194, USA

SO Progress in Batteries & Solar Cells (1987), 6, 73-80

CODEN: PBASDR; ISSN: 0198-7259

DT Journal

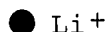
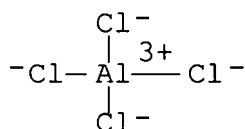
LA English

AB A Li/SO₂ rechargeable battery with LiAlCl₄.cndot.6SO₂ electrolyte has excellent energy d., rate capability, low temp. performance, storability, and overcharging capability. The cycle life of the cells was limited by the degrdn. of the microporous polypropylene [9003-07-0] separator. The cells are safe in overcharging at moderate currents and uncycled cells will vent when shorted. Cycled cells undergo thermal runaway on shorting or external heating and the vent normally used in Li/SO₂ org. electrolyte batteries is not adequate for the inorg. electrolyte batteries.

IT 14024-11-4, Lithium tetrachloroaluminate (LiAlCl₄) (electrolytes contg. sulfur dioxide and, in lithium rechargeable batteries, performance and safety of)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

ST **lithium sulfur dioxide battery safety;**

electrolyte lithium chloroaluminate sulfur dioxide; polypropylene separator lithium rechargeable battery

IT **Batteries, secondary**

(lithium-sulfur dioxide, with lithium aluminum chloride electrolyte and polypropylene separator, performance and safety of)

IT **Electric conductivity and conduction**

(of lithium chloroaluminate-sulfur dioxide electrolyte, for lithium rechargeable batteries, temp. in relation to)

IT **Safety**

(of lithium-sulfur dioxide rechargeable batteries, with lithium aluminum chloride electrolyte, vent design in relation to)

IT **14024-11-4, Lithium tetrachloroaluminate (LiAlCl_4)**

(electrolytes contg. sulfur dioxide and, in lithium rechargeable batteries, performance and safety of)

L102 ANSWER 22 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 100:212959 HCA Full-text

TI Conductivity of lithium aluminum tetrachloride solutions in nitromethane containing sulfur dioxide

AU Zlatilova, P.; Moshtev, R.

CS Cent. Lab. Electrochem. Power Sour., Sofia, 1040, Bulg.

SO Journal of Power Sources (1984), 12(1), 31-7

CODEN: JPSODZ; ISSN: 0378-7753

DT Journal

LA English

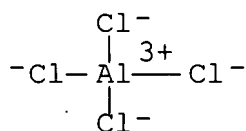
AB The concn. and temp. (-30 to +25°) dependence of the cond. of LiAlCl_4 solns. in MeNO_2 contg. 25 and 50 wt.% SO_2 was studied in view of the possible use of these solns. in Li/SO_2 cells. The cond. of the 1.2m LiAlCl_4 in MeNO_2 with 50% SO_2 at -30 to 25° is similar to that of M LiBr in MeCN with 70% SO_2 , currently used in Li/SO_2 cells.

IT **14024-11-4**

(elec. cond. of, in nitromethane contg. sulfur dioxide)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



● Li⁺

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 76

ST lithium aluminum chloride nitromethane cond; sulfur dioxide lithium battery

IT Batteries, primary
(lithium-sulfur dioxide, lithium tetrachloroaluminate-nitromethane electrolyte for, cond. of sulfur dioxide-contg.)

IT Electric conductivity and conduction
(of lithium tetrachloroaluminate-nitromethane-sulfur dioxide solns.)

IT 14024-11-4
(elec. cond. of, in nitromethane contg. sulfur dioxide)

L102 ANSWER 23 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 100:159558 HCA [Full-text](#)

TI Battery with a sulfur dioxide electrolyte complex

IN Foster, Donald Lee; Kuo, Han Cheng

PA Duracell International, Inc., USA

SO Ger. Offen., 21 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 3328609	A1	19840209	DE 1983-3328609	19830808
		<--		
DE 3328609	C2	19911219		
CA 1210056	A1	19860819	CA 1983-432163	19830711
		<--		
IL 69266	A	19870130	IL 1983-69266	19830718
		<--		
GB 2124821	A	19840222	GB 1983-20037	19830726
		<--		

GB 2124821 B 19851211
 BE 897408 A1 19840130 BE 1983-211261
 198307
 28

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 FR 2531574 A1 19840210 FR 1983-13038
 198308
 08

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 FR 2531574 B1 19861114
 JP 59049159 A 19840321 JP 1983-145623
 198308
 09

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 JP 04035876 B 19920612
 US 4891281 A 19900102 US 1986-830231
 198602
 13

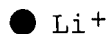
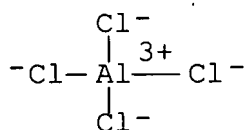
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 PRAI US 1982-405980 A 19820809 <--

AB A nonaq. battery comprises an active solid cathode, an active metal anode, and a highly conducting electrolyte of low vapor pressure. The electrolyte comprises a fluid solvate complex of SO₂ and an alkali or alk. earth salt which is sol. in SO₂ and has a Group 3A element halide anion, the ratio of salt: SO₂ in electrolyte is 1:1 to 1:7. Thus, a battery was assembled with 2 g cathode from CuCl₂ 60, graphite 3, and PTFE 10%; 2 Li anodes; and LiAlCl₄ 3.1 SO₂ solvate-complex electrolyte. The battery was discharged at 4 mA to a cutoff voltage of 2.6 V and was continuously cyclically charged at 20 mA to 4.05 V. The battery was near .apprx.100% cathode capacity for 1 electron transfer at .apprx.350 cycles. The total capacity was 72 A-h at .apprx.36% Li conversion and the original theor. capacity was 0.24 A-h.

IT 14024-11-4D, solvate complex with sulfur dioxide
 (battery electrolyte contg., lithium-copper chloride)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



IC H01M006-14; H01M004-40; H01M004-48; H01M004-50; H01M004-58;
 H01M006-22

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Batteries, secondary
 (copper chloride-lithium, with sulfur
 dioxide-electrolyte complex, performance of)

IT Electric conductivity and conduction
 (of sulfur dioxide solvate complexes with aluminum metal
 chlorides)

IT 7446-09-5D, solvate complex with aluminum metal chloride
 7784-16-9D, solvate complex with sulfur dioxide 14024-11-4D
 , solvate complex with sulfur dioxide 20066-22-2D, solvate complex

with sulfur dioxide
(battery electrolyte contg., lithium-copper chloride)

L102 ANSWER 24 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 96:112272 HCA [Full-text](#)

TI Solid electrolyte battery

PA Toshiba Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 3 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 56156675	A	19811203	JP 1980-47513	
			198004	
			12	

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PRAI JP 1980-47513 A 19800412 <--

AB In a solid-electrolyte battery obtained by successively depositing a Li anode active material, a Li₃N solid electrolyte, and a Li acceptor compd. as the cathode-active material, a Li₃N **protecting layer** (e.g. LiF, LiI, CaF₂, Ca₃N₂, SiO₂) is placed between Li₃N and the cathode active material. The battery emf. is high and the battery service life is long.

IT 7439-93-2, uses and miscellaneous
(anodes, in solid-electrolyte battery)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

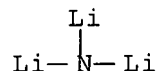
Li

IT 26134-62-3

(solid electrolyte, in lithium batteries)

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)



IC H01M006-18

CC 72-3 (Electrochemistry)

IT 7439-93-2, uses and miscellaneous
(anodes, in solid-electrolyte battery)

IT 26134-62-3

(solid electrolyte, in lithium batteries)

L102 ANSWER 25 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 96:55421 HCA [Full-text](#)

TI **Protective active nitrides** as additives to nonaqueous
cathode materials

IN Joshi, Ashok V.
PA Ray-O-Vac Corp., USA
SO U.S., 3 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 4304764	A	19811208	US 1980-190195	
			198009	
			24	
		<--		
US 4401737	A	19830830	US 1981-291244	
			198108	
			10	
		<--		
EP 48621	A2	19820331	EP 1981-304333	
			198109	
			21	
		<--		
EP 48621	A3	19820714		
R: DE, FR, GB				
JP 57087073	A	19820531	JP 1981-150491	
			198109	
			22	
		<--		

PRAI US 1980-190195 A3 19800924 <--

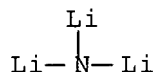
AB A stable, nonstoichiometric cathode for a battery having an active metal (Li) anode is prepd. by reducing the cathode material (MnO₂, FeS, WO₃, TiS, or CrO₃) with the active metal or a precursor compd. of the active metal. Thus, 10 nonstoichiometric Fe sulfide and 0.75 part by wt. Li₃N were mixed, ground, and heated at 450° for 1 h in a dry inert atm. After cooling the mass was powd. and pressed into pellets. Comparative cathode pellets were prepd. by compressing the nonstoichiometric Fe sulfide. Li batteries were constructed with the cathode pellets and 1.2M LiAsF₆ in 40 propylene carbonate and 60% MeOCH₂CH₂OMe electrolyte. Open-circuit voltages of the batteries were measured initially and after periods of time. The cathodes in accordance with the invention were more stable than the comparative cathodes.

IT 26134-62-3

(in manuf. of battery cathodes)

RN 26134-62-3 HCA

CN Lithium nitride (Li₃N) (CA INDEX NAME)



IC C01G045-02

INCL 423593000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 26134-62-3

(in manuf. of battery cathodes)

L102 ANSWER 26 OF 26 HCA COPYRIGHT 2007 ACS on STN

AN 95:122901 HCA Full-text

TI The primary passive film on lithium in thionyl chloride electrolyte solutions

AU Moshtev, R. V.; Geronov, Y.; Puresheva, B.

CS Cent. Lab. Electrochem. Power Sources, Sofia, 1040, Bulg.

SO Journal of the Electrochemical Society (1981), 128(9), 1851-7

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA English

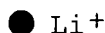
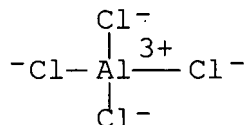
AB The primary passive film on Li in SOCl₂ electrolyte solns. was studied by a galvanostatic pulse technique. The evolution of the resistance and capacitance of the Li electrode in SOCl₂ solns. of LiAlCl₄ under open-circuit conditions is interpreted in terms of a 2-stage process involving the formation of a continuous dense LiCl film and its growth by ion migration energy and/or diffusion across the solid film. The film resistivity, its activation energy, the Tafel current-field relation, and the high field transients give evidence for an ion-conducting solid film. The film growth is limited by its chem. dissoln. The rate of the latter controls the self-discharge rate of the Li anode as well as the growth of the secondary porous film, which is responsible for the voltage delay effects in Li/SOCl₂ primary cells.

IT 14024-11-4

(elec. resistance and capacitance of lithium electrode in thionyl chloride solns. of, passive film growth in relation to)

RN 14024-11-4 HCA

CN Aluminate(1-), tetrachloro-, lithium (1:1), (T-4)- (CA INDEX NAME)



IT 7439-93-2, uses and miscellaneous
(electrode, passive film on, in thionyl chloride electrolyte solns.)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

CC 72-7 (Electrochemistry)

Section cross-reference(s): 76

IT Electric conductivity and conduction
(ionic, of lithium chloride passive film on lithium in thionyl chloride solns.)

IT 14024-11-4

(elec. resistance and capacitance of lithium electrode in thionyl chloride solns. of, passive film growth in relation to)

IT 7439-93-2, uses and miscellaneous
(electrode, passive film on, in thionyl chloride electrolyte

solns.)